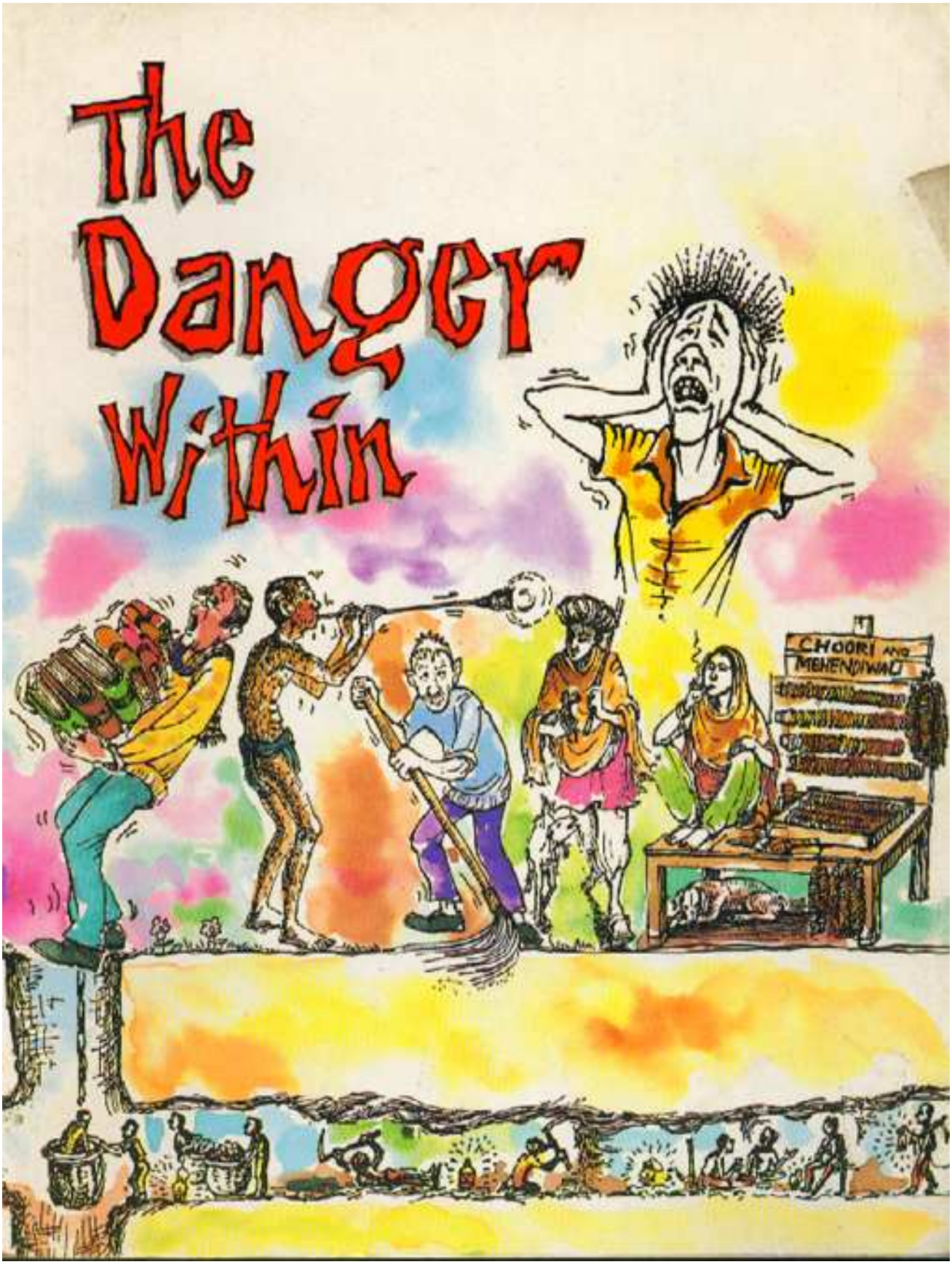
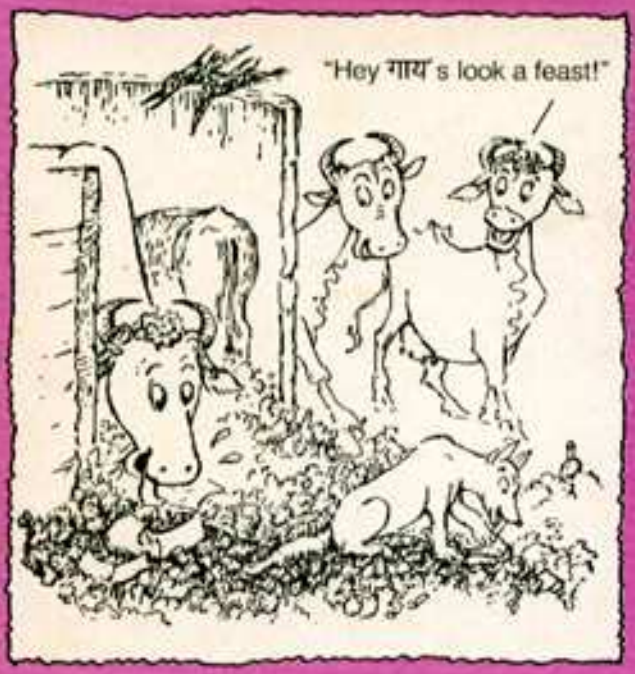
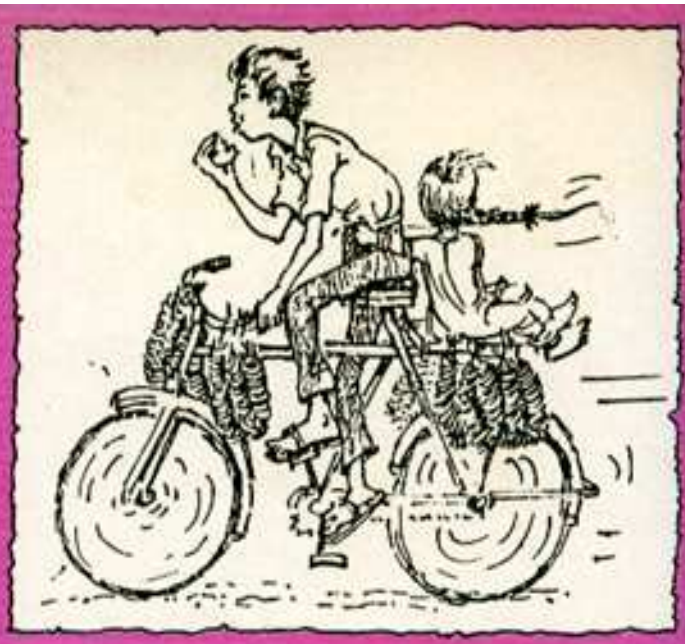
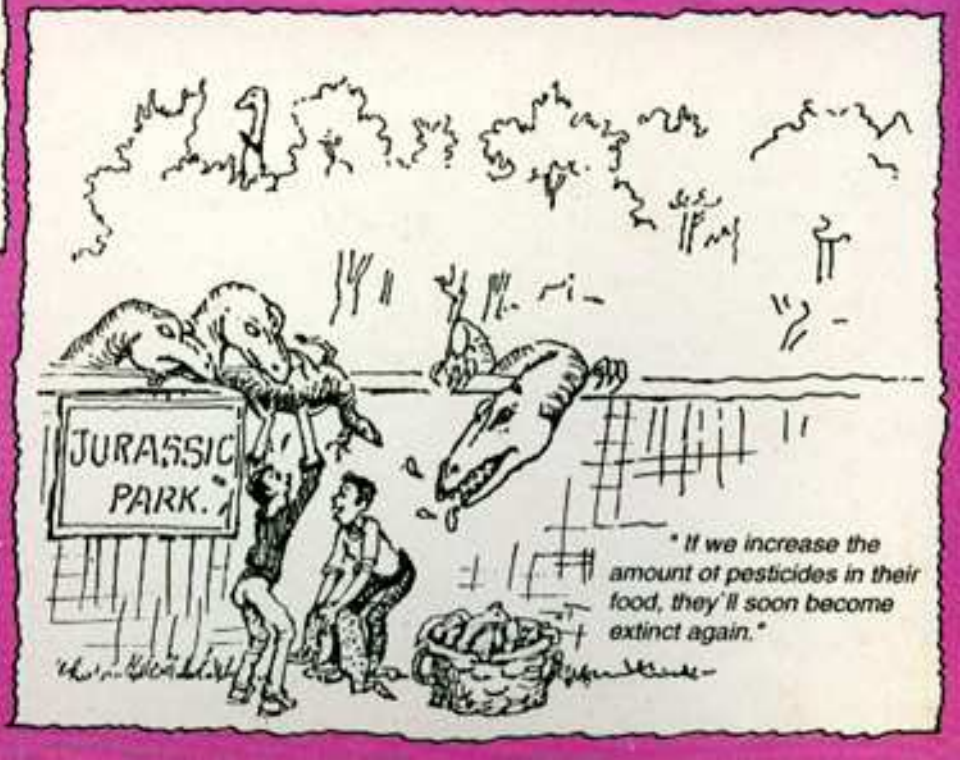

The Danger Within
CHOORI AND MEHENDIWALI


"Hey गाय's look a feast!"




JURASSIC PARK.
" If we increase the amount of pesticides in their food, they'll soon become extinct again."

# The Danger Within

an activity book for students on occupational health hazards

by

Feisal Alkazi
Martha Farrell
Shveta Kalyanwala

Illustrated by Reenie

We would like to thank the following for their help in the writing of this manual:

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# Preface

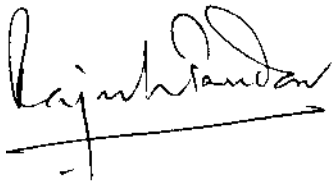
For more than a decade Society for Participatory Research in Asia (PRIA) has been providing educational support on the issue of Occupational and Environmental Health to workers and their groups, government departments and various industries. The main objective of this programme is to contribute towards making living and working conditions of workers healthy and safe. To achieve this we conduct research, surveys, training programmes and produce publications for dissemination.

We recognize the fact that the young people of today are our assets of tomorrow. As workers for the future they have an important role to play in initiating and executing policy. It is predicted that the accelerating trend of mechanization will lead to increase in occupational hazards. In this context there is an urgent need to instil the awareness of the benefits of health and safety at an impressionable age, so that it becomes a part of their consciousness and helps them to overcome problems when and as they surface.

With this in view, we have been conducting poster competitions and workshops in schools. An analysis of this showed that although the children are aware and concerned about the various hazards, very little information is available to them on this subject. The teachers also face the same predicament and lack reference material. Keeping this in mind PRIA in collaboration with Creative Learning for Change decided to publish a book dealing with major aspects of Occupational Health and Safety. Extensive field visits and workshops were conducted to collect the latest authentic data.

We hope that this book will fill the void in this area and help generate constructive awareness and lively interest in young people. We would be glad to provide informative help, if required, for teaching the subject.

I would like to thank my colleagues of the Centre for Occupational and Environmental Health, especially Harsh Jaitli its centre coordinator. I am also grateful to the CLC team, the students and teachers who participated in the workshops and those people that helped in providing support for field visits.



**Dr. Rajesh Tandon**
Executive Director
Society for Participatory Research in Asia

July 1995

**CONTENTS**


| | Page |
|---|---|
| Foreword | 7 |
| About this book | 8 |
| Coal Mining | 10 |
| Textiles | 20 |
| Pesticides | 28 |
| Glass | 35 |
| Child Labour I : Carpet Industry | 45 |
| Child Labour II : Matchstick and Firework Industry | 54 |
| Child Labour III : Lock Industry | 58 |
| Child Labour IV : Gem Industry | 60 |
| Chemicals | 63 |
| Silicosis and Asbestosis | 73 |
| Construction Work | 78 |
| Municipal Workers | 87 |
| In Office | 96 |
| At Home | 103 |

# FOREWORD

Wherever there is an occupation there exists an occupational health hazard.

This manual studies the working conditions that exist in a range of different work places. It covers places where hazards are most obvious - as in Coal Mining, Carpet Weaving and the making of glass. It also studies risks faced by office workers, those working on computers and in other seemingly sophisticated work places which appear risk free.

For people who are experts in the area of Occupational Health, it is like the opening of a Pandora's box. The scenario changes everyday, with new discoveries being made, new hazards and new risks being constantly unearthed.

The chronic cold, headaches, blurred vision that you suffer from could be directly associated with the kind of work that you do. However, a lack of awareness about the risks you face makes you continue working in the same environment.

The scene is changing surely but slowly. Workers and their unions all the world over are now questioning the impact of the work environment on their "physical, mental and social well being". For eg - the use of asbestos has been banned all over the world, except in India. Here it is used extensively as roofing in factories, godowns, houses and even schools. But people are becoming aware of the tremendous hazards it poses to our health and are finding alternatives to asbestos.

Bernardino Ramazzini, considered to be the founder of occupational medicine, commented in 1705: "Its a sordid profit accompanied by the destruction of health....many an artisan has looked at his craft as a means to support life and raise a family but all he has got from it is some deadly disease."

But wait, what does this have to do with students in a school? Students have nothing to do with Occupational Health Hazards.

Construction sites and deep sewage drains are not the only places where occupational health hazards exist. The danger is all around us-faced by our fathers, mothers, brothers, sisters, friends and acquaintances. It is even faced in our classrooms by the teacher whom we meet every day. The effect of chalk dust, strain on wrist and arm from constant use, strain on hearing due to high noise levels - these are all Occupational Health Hazards linked to the school.

Occupational Health Hazard also affects students directly. If our bus driver is affected by toxic carbon fumes, so are we, though to a lesser degree.

Long hours of working on the computer does not affect only the teacher, but us as well.

What we must understand, is that occupational health hazards affect every single person who works. Though health hazards cannot always be totally eliminated they can certainly be minimized. A proper work environment makes for a more efficient worker, and as a result a better work output.

Workers now have been given access to information that was deliberately kept from them earlier.

Concerned employers are for the first time making provisions for worker`s safety and many a time learning about dangers that lurk in their work places.

The focus of the book is to encourage the reader to start thinking, feeling and analyzing the existing situation of work places in our country. It is only when there is a change in attitude, that one can initiate a process of change.

**"NEVER DOUBT THAT A SMALL GROUP OF THOUGHTFUL, COMMITTED PEOPLE CAN CHANGE THE WORLD. INDEED IT IS THE ONLY THING THAT EVER HAS."**

**Margaret Mead**

## ABOUT THIS BOOK

"Health is a state of complete physical, mental and social well being, not merely an absence of disease and infirmity."

This is the definition of health as stated by the WHO. By this definition, millions of workers all over the world are obviously not keeping good health. There are also others who apparently enjoy good health, but are unaware of the hazards they are exposed to at work.

What are occupational health hazards and whom do they affect? This issue has gained importance in today's world, as more research is being done in this area and new facts are being brought to light everyday.

Since occupational health hazards affect all our lives, we thought it was a good idea to share facts and information on this issue with students. And what better way than in the form of a manual?

Preparing this manual on occupational health hazards was a lot of hard work, but it was a learning process. Our visits to carpet manufacturing units and coal mines were eye openers and we gagged and choked on the acrid fumes from the chemical factories and textile mills. Yet workers breathed this same air everyday.

We even learnt that many of them were unaware of the dangers they faced in their work place. Others who knew of the dangers had no options, they had to work. Protests to the employer could mean losing their jobs.

To get correct information and a global perspective we read through thousands of pages of material - reports, newspaper clippings, research documents. We went through books on occupational health hazards and its history. We scanned reams of materials produced by organizations, groups and workers themselves who were doing active work to bring about change in this area. We also met workers afflicted by various disease contracted in their work places, and had detailed discussions with them.

The situation is however a fast changing one. Employers are forced to face issues of workers health and safety. Workers are being compensated for injuries and damages during working hours; safety devices have been installed and debates and discussions are now taking place at different levels. The stress is on prevention rather than cure.

Loaded with tons of information the task before us was what all and how to convey this to the reader. We deliberated and discussed this issue for a long time.

The result is a manual that has been designed to keep alive the reader's interest at every stage. We have attempted to create a harmonious blend of information and activities.

Each chapter focuses on a particular area or hazard. We have been very selective in our choice of Occupational Health Hazards. The main reason is that the book could then cover a variety of areas, especially those which we think would interest students.

The book includes step by step details of undertaking creative activities like - how to make a model lung, how to make a kaleidoscope etc.

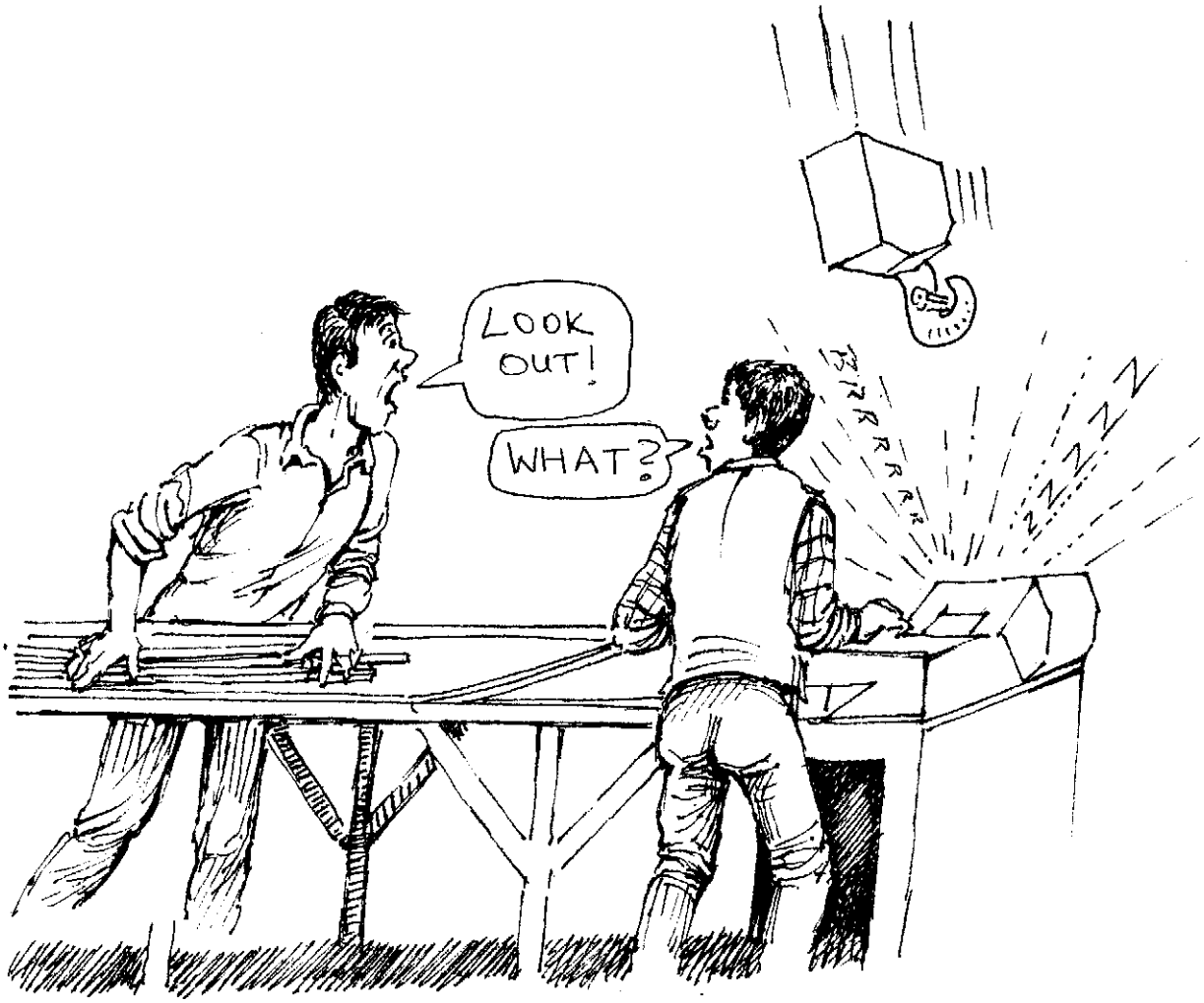
In addition, there are the more conventional activities which have also been detailed out. These include, among several others, how to make a bar chart, carry out a discussion as well as prepare for and present a role play.

The manual is interspersed with crossword puzzles, quizzes, word jumbles based on information that each chapter contains. Cartoons and illustrations do not only add to the fun and provide humour - look at them carefully, they give crucial information.

All activities do not involve going and visiting a particular area of work. Many are classroom based and can be done in groups or individually. The chapters follow no particular sequence. To begin with you can choose any chapter at random. We are sure that the activities and information given, will enthuse you to move onto other chapters of your interest.

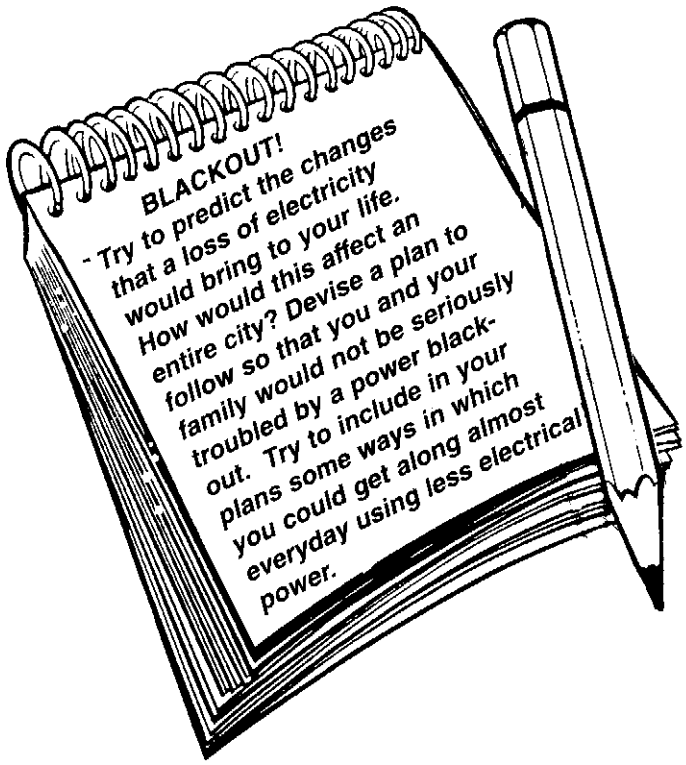
The manual has been field tested with students of Anandalaya School at Anand and five schools from Delhi. They critically reviewed each chapter - its content, layout and design and gave important suggestions to improve the book.

We hope you enjoy the book and through it are able to learn a lot, do a lot, think and feel a lot and of course have great fun in the process.



# COAL MINING

"Coal mining - probably the most hazardous job a man could have," is the way one coal miner's wife described her husband's profession. Unstable ground and roof, explosive methane gas, harmful dust, poisoned atmosphere, cramped and claustrophobic tunnels - these have been the hazards faced by miners since people began digging for coal.

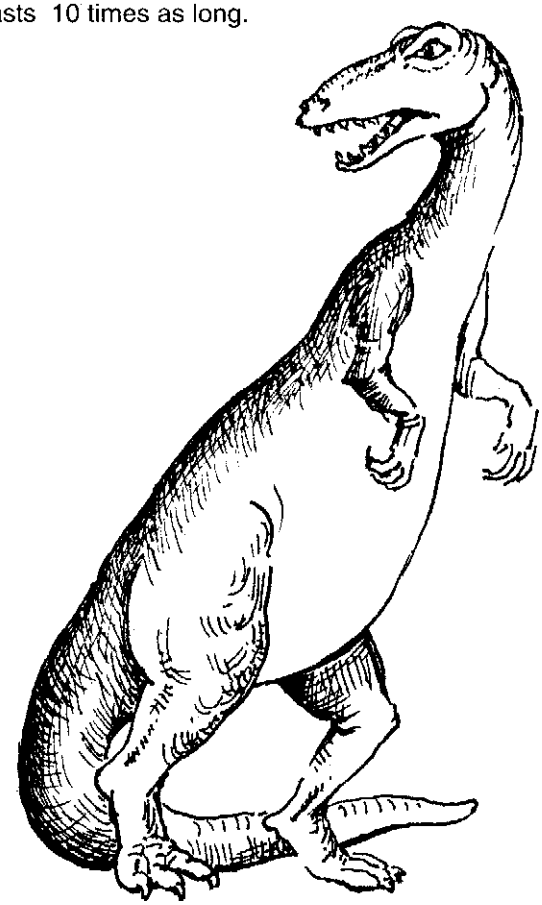

BLACKOUT!
- Try to predict the changes that a loss of electricity would bring to your life. How would this affect an entire city? Devise a plan to follow so that you and your family would not be seriously troubled by a power black-out. Try to include in your plans some ways in which you could get along almost everyday using less electrical power.

Did you know that to keep just one 100 watt bulb lit for 12 hours a day for a whole year, we would be :-

* Burning 394 pounds of coal if the electricity came from a power plant that uses coal.
* Burning this coal would produce 936 pounds of carbon dioxide and 7.8 pounds of sulphur dioxide.

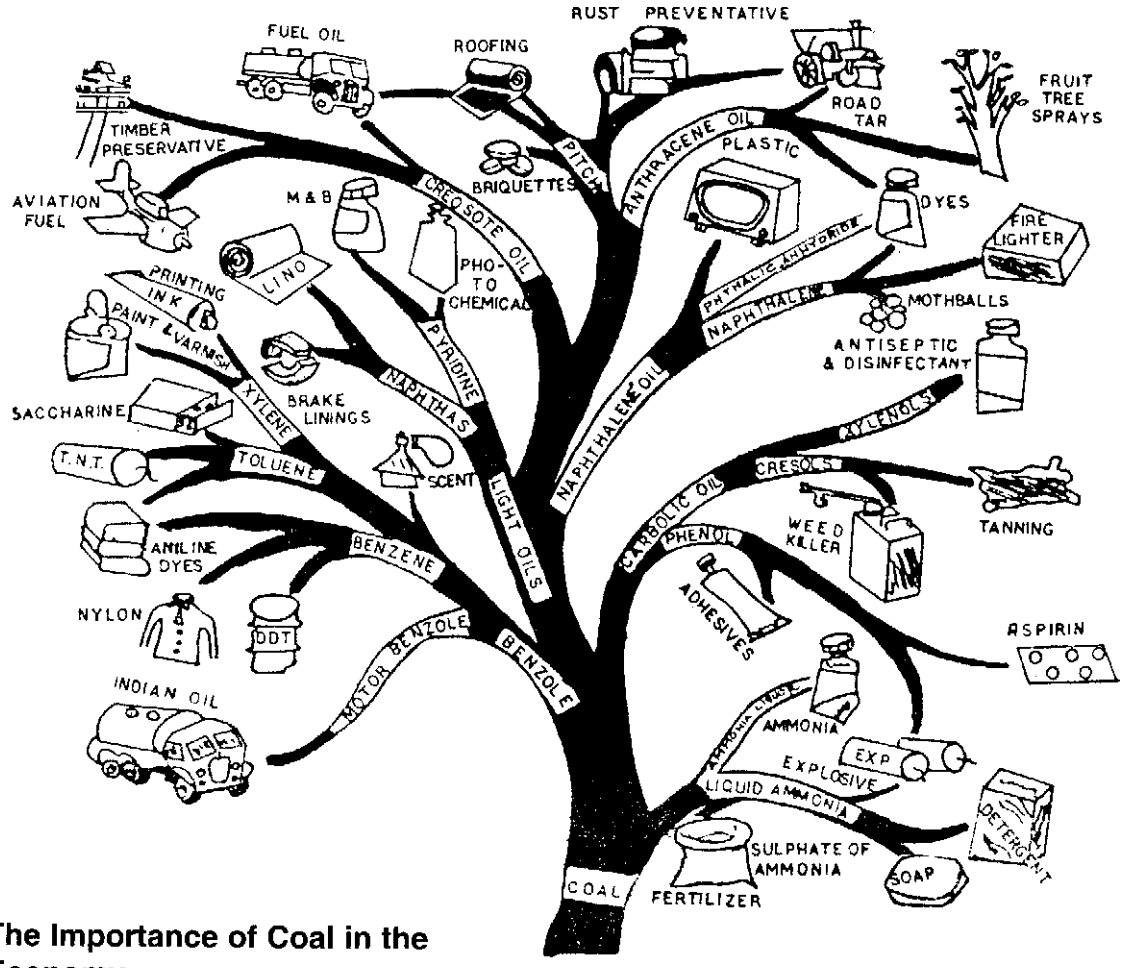
So think twice before switching on a bulb!

Think of replacing it with a fluorescent tube because an 18 watt tube light provides as much light as one 75 watt regular bulb and lasts 10 times as long.



## What is Coal?

You may not believe it, but coal is made up of age old vegetable matter and trees. As vegetation rots and accumulates at the bottom of lakes, river-valleys and marshes - it gets covered with sand or clay. Over time this vegetable matter gets converted into coal due to pressure and temperature. For instance, the coal deposits that we tap in India are about 270 million years old - that is from even before the age of dinosaurs. So the piece of coal you see today was just a rotting vegetable while Tyrannosaurus Rex chomped on a nearby animal!




## The Importance of Coal in the Economy

Coal is the backbone of the Indian economy as it is the major source of energy.

Railway trains, steamer ships and factories are all run mainly from the power derived from coal. Coal produces electricity, in fact thermal power plants use 50% of the coal that is mined in India, followed by railways and steel plants. Iron, that is vital for our industrial development , depends entirely on coal, because to produce iron, iron ore is reduced with coke from coal.

And the houses we live in? They are all the products of coal as the manufacture of brick, cement and lime all need coal. Besides this, explosives, scents and dyes,insecticides, synthetic petrol and ammonia are all made of chemicals obtained from coal. Even the roads on which we travel are made of coal tar.

Coal is costly today not because of an increase in the wages of the labour force involved, but due to the higher transportation costs and the commission taken by the middlemen.

Coal is essentially composed of carbon, hydrogen, nitrogen and oxygen. If the coal contains a greater amount of carbon, and a lesser amount of oxygen it is considered to be of a better quality.

## Coal Mining : How is it done?

It is through investigation by geologists that we come to know of underground coal deposits. Mines can be of two types - "open cast mines " where the coal is at /near the surface, and "underground" mines, where the miners have to travel down through mine shafts or pits and then move into tunnels to mine the coal. Inside the mine, pillars of coal are left to support the roof and prevent it from collapsing while miners work further and further into the `seam.

Once workers enter an underground mine by a lift, their initial job is the drilling of rocks with an electric drill and then planting dynamite sticks in these holes. After a warning, blasting is done which is followed by the breaking and collecting of rocks. A pneumatic rock cutter is then used to cut the rock. Then the water spray pipe, the airflow from the exhaust and the roofing of the mine, all of these are extended to reach the new, exposed coal face. After cutting, the coal is taken from here to the base of the shaft in baskets carried on the head or in wagons. Finally the coal is lifted to the surface in baskets/tubs (like water is drawn from a well) or through the use of lifts and other machinery.

## The Risks Involved

The major problem faced by miners working at the seam is one of regular exposure to coal dust.

As we all know it is the job of the lungs in our body to let oxygen into our blood, and carbon dioxide out. They are made on the same pattern as a tree with a hollow trunk, branches, twigs and leaves. The windpipe forms the trunk, the finer air tubes or bronchi are the branches and twigs, while the minute air sacs or alveoli are like the leaves. It is from the alveoli that oxygen enters the blood and carbon dioxide leaves.

The dust particles that surround us in the air, and that we breathe in daily are filtered first by our noses, or stick to the fine film of mucus on the walls of the bronchi. The mucus then carries them up to the mouth. However dust that is very fine manages to penetrate the alveoli and is collected through a very fine system of tubes called lymphatic that carry it towards the central part of our lungs, where it stays for the rest of our lives.

Just imagine the vast quantity of dust that accumulates there and then read on to understand the havoc it can cause.

The first symptom of this disease called pneumocosis is an unusual shortness of breath when we exert ourselves. It gradually develops over a 6 month - 10 year period into a shortness of breath on the slightest exertion. Coughing brings up spit that may be flecked with blood, you lose weight and your lips, finger nails and the rims of your eyes become permanently blue. Mild pneumocosis increases your risk of getting TB, severe pneumocosis affects your heart and can result in death over a 10 year period.

Dust reduction is therefore crucial for the control/prevention of pneumocosis. The problem lies in the fact that very few dust control measures are practiced in Indian mines i.e. water sprays or protective masks for the miners. In fact in the introduction of modern drilling, cutting and crushing techniques into already ill-ventilated mines has increased the hazards faced by the miner.Further the fact that the smallest particle visible to the naked eye is 50-100 microns in diameter, while the particles most dangerous to our lungs are five microns or even smaller, keeps the miner unaware of the risk he is taking. In fact even though you can often only `see' dust when a shaft of sunlight percolates a dark room, this doesn't indicate to you whether it is harmful or not.

*In the USA a coal worker today can claim compensation for more than 15 years if there is any sign at all of lung disease, irrespective of clinical findings.*

*Normally each man has to clear a space 4 or 5 yards wide. If the seam of coal is 3 or 4 feet high, each man has to cut out, break up, and load onto the belt something between 7 and 12 cubic yards of coal. This is to say, that each man is shifting coal at a speed approaching 2 tons an hour. But they are not only shifting monstrous quantites of coal, they are also doing it in a position that doubles or trebles the work. They have got to remain kneeling all the while - they could hardly rise from knees without hitting the ceiling - and you can easily see by trying it, what a tremendous effort this means. Shovelling is comparatively easy when you are standing up, because you can use your knee and thigh to drive the shovel along; kneeling down, the whole of the strain is thrown upon your arm and belly muscles. And the other conditions do not exactly make things easier. There is the heat-it varies, but in some mines it is suffocating- and the coal dust that stuffs up your throat and nostrils and collects along your eyelids, and the unending rattle of the conveyor belt, which in that confined space is rather like the rattle of a machine-gun. The most definitely distinctive thing about miners are the blue scars on their noses. Every miner has blue scars on his forehead and nose, and will carry them to his death. The coal dust of which the air underground is full, enters every cut, and then the skin grows over it and forms a blue stain like tattooing, which in fact it is. Some of the older men have their foreheads veined like Roquefort cheeses from this cause.*

***George Orwell***
*The Road to Wigan Pier*

Darkness :- It is difficult to even imagine how dark it is in a mine. This quotation will give you a clear idea :

"It is hard to describe the darkness of the pit. It is absolute blackness, impenetrable and eerie. Sounds appear to be magnified, the creaks of roof movement sounding like cracks of doom and the falling of loose pieces of coal from the front of the coal face becoming frightening crashes. These noises that are normal to the pit head are usually ignored in the presence of light and company. But when my lamp went out, the man in the next working place could not hear my shouts, and tears came to my eyes as I had to crawl in the darkness, feeling my way as best as I could until they were able to hear me."

Today battery run lights on the miners helmet and electric lights on the walls of the seam, dispel this forbidding darkness. These are made in a way that even a spark from them cannot ignite the inflammable gas that may be present in the mine.

Temperature : Mines vary in temperature from those that are very hot where work is done bare-bodied, to those that are cold or are dripping wet. More often than not, underground mines are below the ground water level.

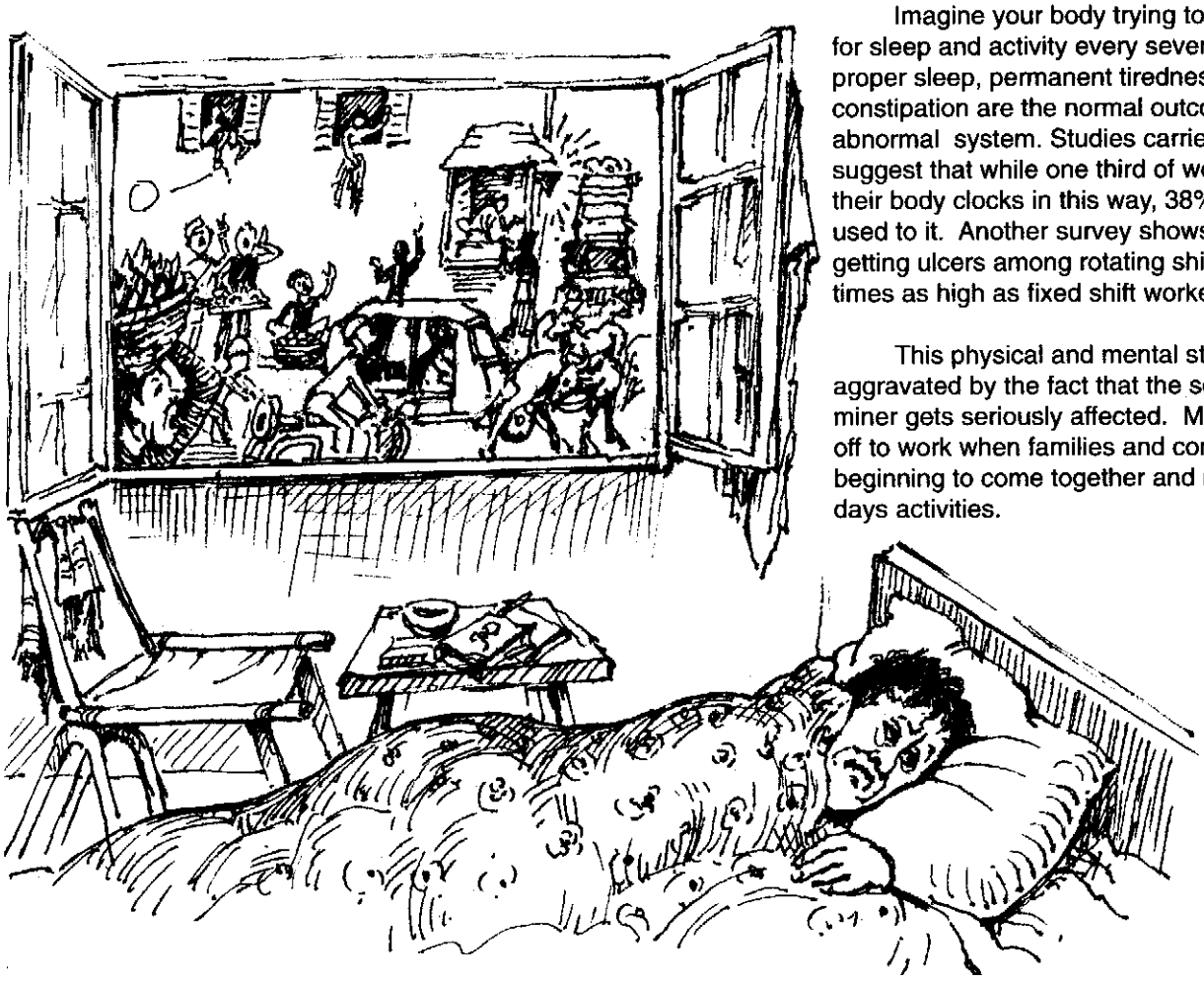
The absence of fresh air and the humidity of many mines makes most of them hot and stuffy. Circulation of air is made possible through passing in fresh air through exhaust fans and clearing out the impure air.

Methane gas or marsh gas is often also found in underground mines. This gas can explode when it comes in contact with air, if it is ignited by a flame or an electric spark. Davy's safety lamp used by the miners indicates the level of methane in the air by the height of its flame.

** Did you know that charcoal powder is an effective traditional`datun' (tooth powder).*

The other major threat to the miner's physical, mental and social well-being comes from shiftwork. We all know what `jet lag` means - the disturbance caused to our bodies and minds due to flying across time zones. Shift lag is exactly the same, as it continuously attempts to alter your body clock.

In the mines we visited in Dhanbad to get a feel of the subject, before writing this manual, we found that miners normally worked in three shifts of eight hours each : 8 am to 4 pm, 4 pm to 12 pm, 12 pm to 8 am. Each miner does a shift a day for a week at time : i.e. if the first week is the morning shift, the second is the evening, and the third the night shift.



Imagine your body trying to set a new rhythm for sleep and activity every seven days! Lack of proper sleep, permanent tiredness, irritability and constipation are the normal outcomes of this abnormal system. Studies carried out in Europe suggest that while one third of workers can adjust their body clocks in this way, 38% just cannot get used to it. Another survey shows that the rate of getting ulcers among rotating shift workers is eight times as high as fixed shift workers.

This physical and mental state is further aggravated by the fact that the social life of the miner gets seriously affected. Most often they are off to work when families and communities are just beginning to come together and relax after the days activities.

Of course, the most dangerous of all mining hazards is the possibility of an accident taking place.The roof may collapse, an underground explosion may occur, miners may get lost or the mines flooded. The possibilities are endless. But to what extent are these accidents "inevitable" or are they really an outcome of lack of safety precautions or negligence or poor working conditions? The box item on Dhanbad and the news report given alongside raises these crucial issues.

# All trapped coal miners found dead

By SUDHIN DEY
The Times of India News Service

ASANSOL, January 27 :

IN one of the worst coal mine disasters in recent times, all the 55 coal miners , trapped inside the burning New Kenda colliery of the eastern Coalfields were found dead this morning by the rescue teams sent underground.

The fire is still blazing at a 110-feet stretch of one of the main tunnels inside the mine close to the pithead. The carbon monoxide generated by the fire led to death by asphyxiation of the miners , it is believed.

All the bodies have been traced and 41 of them were brought to the pithead to be lifted in twos and threes with the help of the electrically-operated cage.The first body was brought out at 4.30 a.m. today. Ten bodies were brought out by noon and sent to hospital.

Mukhi Dussad, whose body was one of the first to be brought out, left a note under the band of his wrist-watch which spoke eloquently of the tragedy that struck the victims. The note in Hindi said " it is now 10 p.m. Although we are trying to save ourselves I dont see any chance of escaping the clutches of death which is closing in on us".

The note made it clear to the mining authorities that the trapped coal miners had died within six to eight hours after the mine caught fire at about 3.30 p.m. on January 25. The bodies had become black and stiff with the heat of the fire and fine coal dust. That all of them had tried their best to save themselves is evident by the fact that almost all the bodies had a towel tied on their nose and mouth to escape the toxic gases.

HEART-RENDING SCENE:

The scene at the pit entry was one of sorrow and anger. The wives, mothers and children of the victims sat huddled in the winter sun with their faces cast down. Whenever a body was brought out they rushed to see if it belonged to their near one. The ambulances were surrounded by the wailing relations of the victims when the vehicles carried the bodies to hospital.

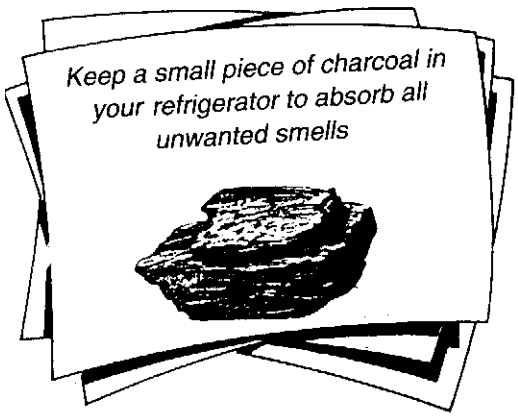
Streams of people from adjoining collieries thronged the pit entry. Many became restive and threw stones as the police prevented them from coming closer to the site to see the bodies. The crowd shouted " it was the negligence of the authorities which had resulted in the death of so many of their comrades".

Incidentally, Mr R.A. Aggarwal, general manager of Sonepur Bazari colliery , who was conducting the rescue operations said that, " carbon monoxide levels at the places where the miners bodies were found was above 800 particles per million (ppm), against the normal safety level of less than 200 ppm".

**See Edit: Sacrificing Safety**

He said forty-three search teams had gone down till noon today in search of the victims. The bodies were found at a depth of 450 to 500 feet away from the pithead.

Mr Haradhan Roy, the local CPM MP who is the general secretary of the CITU-controlled Colliery Mazdoor Sabha of India described the incident as a "cold blooded murder by the ECL authorities which had violated all norms of safety within the mines". He alleged that the miners were not given the mask called "self-rescuers" which allowed the miners to walk past carbon monoxide field zones to safer areas. Apart from negligence in safety measures, the authorities , he complained, had failed to arrange a quick rescue operation which could have saved the lives of the victims.




## TRAPPED UNDERGROUND

**The tense work atmosphere within a coal mine and the sounds, smells and feelings it engenders has inspired writers from Emile Zola to D.H.Lawrence, from George Orwell to our own Mahasveta Devi.**

**The small section given alongside conveys some of the environment of the mine.**

**Read this aloud and other given passages in the classroom. Everyone should share their thoughts on the following:**

*** Manmade and natural tunnels - what would the main difference be between the two ?**

*** What kind of tunnels have you been in - describe your own experience.**

*** How would you feel spending eight hours a day underground in a mine? Would the inside of the tunnel smell? What noises might you hear? What would the sides of the tunnel feel like if you touched them?**

*** What posture would you have to adopt to work in a tunnel? And for how long would you have to maintain it? Would the enclosed space give you a feeling of claustrophobia? (claustrophobia means a dread of being in a confined space)**

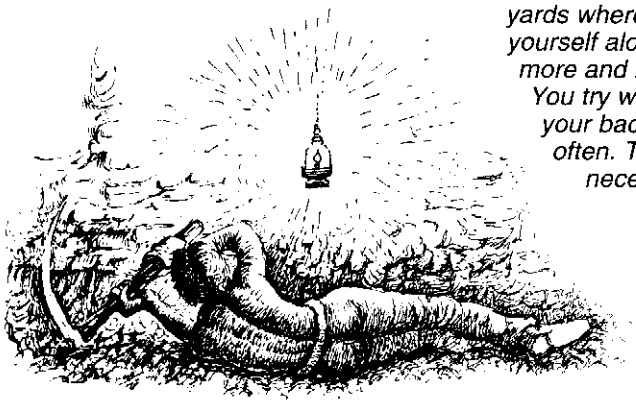
**Write a prose passage about miners trapped in an underground mine with no way to escape ..... and the minutes ticking away.**

*You get into the cage, which is a steel box about as wide as a telephone box and 2 or 3 times as long. It holds 10 men, but they pack like sardines in a tin, and a tall man cannot stand upright in it. The steel door shuts upon you, and somebody working the winding gear above drops you into the void. You have the usual momentary qualm in your belly and a bursting sensation in the ears. When you crawl out at the bottom you are perhaps 400 yards underground. That is to say have a tolerable-sized mountain on top of you; hundreds of yards of solid rock, bones of extinct beasts, subsoil, flints, roots of growing things, green grass, and cows grazing on it - all this suspended over your head and held back only by wooden props as thick as the calf of your leg.*

*What is surprising, is the immense horizontal distance that have to be travelled underground. Before I had been down a mine I had vaguely imagined the miner stepping out of the cage and getting to work on a ledge of coal a few yards away. If it is a mile from the pit bottom to coal face, that is probably an average distance; 3 miles is a fairly normal one; there are even said to be a few mines where it is as much as 5 miles. But these distances bear no relation to distances above ground, for in all that mile or 3 miles as it may be, there is hardly anywhere outside the main road, and not many places even there, where a man can stand upright.*

*You do not notice the effect of this till you have gone a few hundreds yards. You start off, stooping slightly, down the dim-lit gallery, 8 or 10 feet wide and about 5 feet high. At start, to walk stooping is rather a joke. You have not only got to bend double, you have also got to keep your head up all the while so as to see the beams and girders and dodge them when they come. You have, therefore, a constant crick in the neck, but this is nothing ..... After half a mile it becomes (I am not exaggerating) an unbearable agony. You begin to wonder whether you will ever get to the end - still more, how on earth you are going to get back. Your pace grows slower and slower. You come to a stretch of couple of hundred yards where it is all exceptionally low and you have to work yourself along in squatting position. Ducking the beams becomes more and more of an effort, and sometimes you forget to duck. You try walking head down as the miners do, and then you bang your backbone. Even the miners bang their backbones fairly often. This is the reason why in very hot mines, where it is necessary to go about half naked, most of the miners have what they call 'buttons down the back' - that is a permanent scab on each vertebra. The miner does that journey to and fro everyday, and sandwiched in between there are seven and a half hours of savage work.*

***George Orwell***
*The Road to Wigan Pier*



## CASE STUDY - DHANBAD

As far as safety precautions go miners at Dhanbad are provided with helmets, and shoes are supplied once every 6 months. On an average every two weeks the shoes give way-and nothing is done by the management for their repair. Going into the mines barefoot is not allowed. So they have to use their own regular shoes.

Dust sprays to settle the dust after blasting are not used and neither is drinking water provided. Previously water bottles were supplied to the miners but this is no longer the case. No food is carried down. Travel arrangements are your own to the pithead whatever the time of the shift, and no bathing facilities are provided once the shift is over.

Today all miners go through a vocational training course. This includes training in the use of a `self rescuer' which will keep one alive for upto half an hour, but such gadgets are not provided.

In most places the safety requirements of the Directorate General of Mines Safety are rarely implemented. In underground mines there are less supports than stipulated, spraying to settle the dust after blasting is rarely carried out, and the filling of old mines with sand is almost never done, resulting in a caving in of the earth over a period of time. In open cast mining the scientific `step' approach is rarely used, in which the earth is cut in large steps from which the coal is extracted. Instead extremely deep, wide "open mines" are dug and often the workers live literally on the edge. This becomes even more dangerous as blasting is frequent in open cast mines.

## The History of Coal Mining in India

Coal mining started in India in the 18th century in Bengal and slowly went on expanding in different states due to the increasing demand.

Initially the entire family including children would enter the mines. From surrounding villages, families would come approximately twice a week for shifts of more than 20 hours duration. There were no restrictions on their entry and exit from the mines, they were free to smoke, sleep, cook and work wherever they wanted. Often they would eat and sleep within the mines. There were instances of child birth in the underground mines and new-born babies were enrolled as future workers of the company. The company paid one rupee for every male child and eight annas(fifty paisa) for every female child !

Most of the work was done manually and only that machinery was introduced that was already out of date in England, or that had already been extensively used. Working conditions were abysmal and no steps were taken for the restoration of the landscape that had been destroyed by mining.

## WOMEN WORKING UNDERGROUND

"I have a belt round my waist, and a chain passing between my legs, and I go on my hands and feet...The pit is wet where I work, and the water comes over our clog-tops always, and I have seen it up to my thighs.....My clothes are wet through almost all day long.....I have drawn till I have had the skin off me; the belt and chain is worse when we are in the family way (pregnant)."

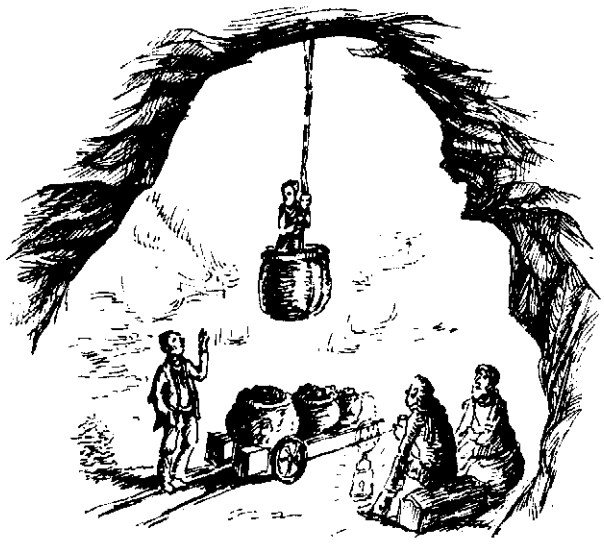
In the early 1800's, as many as 5,000 women worked in the mines in U.K. alone. In 1841 a Royal Commission investigated their work conditions, and banned women from working underground, saying that `a woman's place is in the home'. For many thrown out of the mines, there was no alternative employment and they disguised themselves as men in order to keep their jobs. It was only in 1980 that women won the right to be coal miners once again, in the U.S.A.

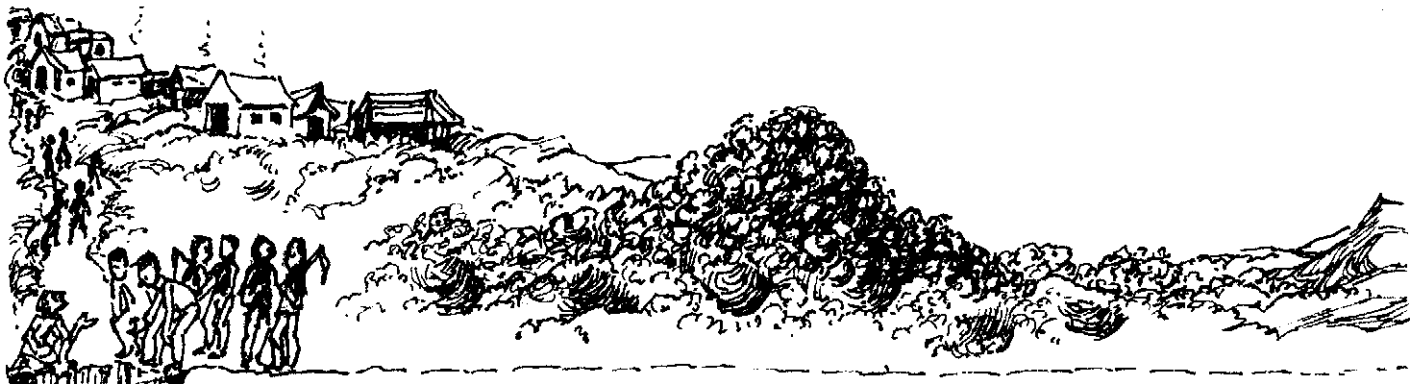
## And in the West

In the West, from a very early date, miners were seen as savages, or a race apart. Their status is apparent in a court judgement of 1699 in which 17 convicts had their sentences remitted by agreeing to work in the mines for five years. In Scotland, a century later the miner and his wife remained tied to the feudal lord, forbidden by law to move away or change their hereditary profession.

Conditions of workers were even more hazardous in those days. Miners were sent down sitting on loops of rope. They worked in the light of candles, despite the risk of an explosion if methane gas was present in any quantity. This risk increased as coal braziers were placed at the bottom of mine shafts to provide fresh air (as hot air travels upwards, creating a current) and due to the gunpowder that was present to break up the coal face. Men heaved and shovelled the coal, often working lying down or on the knees due to the limited space and hauling was done by women and children.

The spurt in the demand for coal due to the Industrial Revolution, meant in many cases the miners were worse off, as the mines were dug even deeper, and often were like mazès without proper maps, in which working children and adults alike could get trapped.





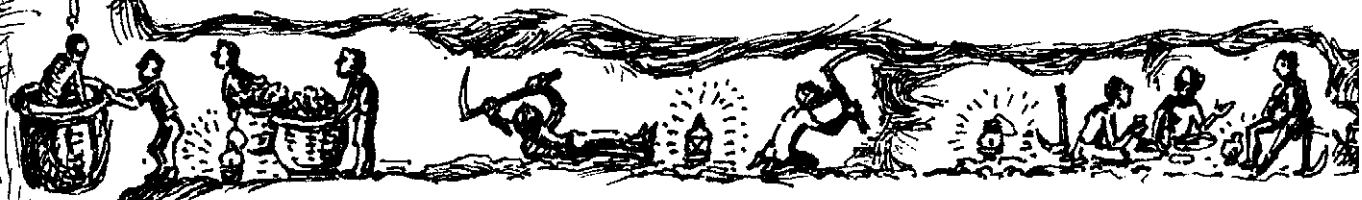
## THE PIT VILLAGE

Miners more than most other people, have found their way of life shaped by their work. Living in and around areas where coal is normally found, they have worked almost exclusively in contact only with other miners. As a result miners all over the world have remained regional in their outlook, bound together by a strong sense of camaraderie(mutual trust and friendship.) Community spirit has also been kept alive by shared misfortune, as every mining family has to live with the constant fear of death.

The housing that we saw in and around Dhanbad was largely temporary, and like everything else in a mining landscape, completely covered by fine coal dust. The landscape was totally ravaged by open cast mines, several hundred feet deep, and the most precarious living conditions of all were those of miners who lived on the very edge of the open cast mines.

## PIT PONIES

For a long time in the West, underground hauling of coal was done by ponies, driven by boys. At any point of time there would be hundreds of `pit ponies' at work in a mine, many of them spending their entire lives underground! These animals were the hardest driven. Even though men and boys worked shifts, all too often the same ponies were used from one shift to the next. For several hundred ponies, the first time they saw daylight was during the long national strikes in Britain in 1921 and 1926, when they were brought to the surface and allowed to graze.



## WRITE AN EVOCATIVE REPORT

**The detailed news report given on page 8 captures both the mood and feeling, as well as all the factual details of an actual mine disaster. Through his descriptive writing the author, Sudhir Dey makes us feel we are `there', and extends our emotional response by giving us actual facts and figures. The combination of both these elements makes for the best of journalistic writing.**

**1. Collect material from different sections of this manual, along with news reports of an actual industrial disaster that has taken place recently. Locate material written by different authors for different publications.**

**2. Using this material as a research background, write an original piece that brings together feelings and facts.**

# ILLEGAL COAL MINING

The recent accident at the Chapapur Colliery, in Dhanbad district brought into focus the existence of illegal coal mines in our country. With the price of coal continuously going up and with good quality (i.e. low ash content ) coal commanding a substantial premium in the market, particularly after it has been cooked in the ovens and turned into hard coke, it has become profitable to work small, abandoned mines. In Dhanbad district, where coal is found very close to surface, it is very easy to carry on mining on a small scale . Of course these illegal mines may not necessarily be profitable in a normal sense (when all the usual costs are taken into account).... But when the only cost that the operators of these mines have to bear is that of labour, and that too of labour that is paid barely a starvation wage and is held in bondage by poverty and terror it is more than worthwhile. No material costs are incurred as the materials are `supplied' from the nearby legal mines, whose officials play an important role in this illegal mining. The coal is taken to illegal depots and from there transported by truck to the consumers. Needless to say, the coal is moved with all the necessary official papers.

Illegal coal mining is directly conducted by the infamous mafia of the area. But these politically organized groups of criminals have close connections with officials of all kinds.Illegal mining is only one, and that too not the most important, of the many illegal activities in the coal belts.

A good example of such ` enterprise' can be found at the Sudamdih coal washery. After a very low recovery of the coal(only 30 to 40 per cent) the rest of the coal should go from the `thickener' to the `reject bin'. But a portion of this is instead `bled' and goes into the nearby Damodar river, where it forms a sediment on the sand. About three to four thousand people are employed in cutting and cooking this coal to make it into coke. For the mafia it means a business of about Rs.40,000 per day.

## OR DESIGN YOUR OWN COMIC STRIP

**Encourage those of your friends who have greater visual, rather than written, abilities to create a cartoon strip around the same.**

**Follow the steps given below to come up with excellent results!**

**a) Read through the story trying to visualize it as you go along.**

**b) Now begin making rough sketches of the various events. These could be done as drawings in pencil, using stick figures.**

**c) Look through all your drawings - do they effectively capture the various emotions of the story? Would some of these look better in `close-up', as for example the coal miner's face once the accident has occurred, and others look better as `long-shots', like the miners getting trapped in the mine?**

**d) Think of how you should begin the story - with the miner's leaving for work or with them entering the mine..... Also how do you want to end your story? With the appearance of a news report on the cremation of the miners, or in some other way? Sketch out possible alternatives and choose between them.**

**e) Arrange all your sketches in the correct order, removing those you don't want to use. Would speech bubbles help your story along, or thought bubbles? Keep these as few as possible and allow your visuals to do the talking.**

**f) Think of size, can the size of each visual reflect the importance of it in the story? Work out which visuals need to be larger and which smaller.**

**g) Select the kind of drawing materials that you feel will best express this story; short, stubby crayon strokes or a drawing in felt pens may be more effective than water colours. Why?**

**h) Now let's see how colour can bring out a certain mood or feeling. What colour are the miner's clothes and the implements used in the mine? Using greys and browns may help us capture some of the `claustrophobia.'**

**i) Now is the time to finalize your comic strip. Draw out a rough grid on your drawing paper, giving each illustration the kind of weightage it deserves. Work on the drawings one at a time. Once they are all done, you will have to see whether there is a `balance' in the entire composition. Maybe a rearrangement of certain parts of each drawing will help you achieve this.**

**j) Colour can also help us create balance in a composition. Fill colour into some of your key illustrations so that you know what the overall impact will be.**

**k) Over a period of several weeks, complete your entire comic strip including filling speech and thought bubbles, critically examining it from time to time.**

**Your comic-strip is now ready for display for the rest of your school.**

# RAPID INDUSTRIALISATION SPELLS DEVASTATION IN TALCHER

The massive coalfield and the consequent rapid industrialisation have brought untold misery to thousands of villagers, changing the face of what was once the most idyllic place in Orissa. Already, the Angul-Talcher area has earned the dubious distinction of being one of the 14 most polluted zones in the country.

All water sources have been polluted and the air is thick with coal dust and countless toxic gases being emitted by the industries. As a result, the number of patients suffering from lung and respiratory tract ailments is growing alarmingly. More than 90 per cent of the houses adjoining the mines have developed cracks.

The floating dust is wreaking havoc on all vegetation. Soil fertility, too, has been reduced. The continuous heavy depletion of underground water sources has resulted in drying up of almost all wells. Today wells have been reduced to mere storage tanks, being filled in with water supplied by the mine authorities.

Coal extraction at Talcher was initially confined to underground mining. But problems cropped up when open-cast mining was taken up in the sixties. Till then, the villagers did not visualise that what was being done in the name of development would actually spell disaster for their livelihood in the days to come. Earlier, the villagers used to get at least daily employment in the form of manual labour in the underground mines. But that prospect slowly dried up as more and more opencast mines began operating with heavy machinery replacing manpower.

This apart, what is disturbing the villagers most is that hundreds of acres of farm and homestead lands are being acquired every year for mining. For the time being, the authorities plan to evacuate all people in at least 27 villages.

# Textiles

The skirt and blouse, shorts and T-shirts and the pretty outfits that you wear - have you ever wondered where they come from? How does a simple ball of cotton get processed into these floral motifs, big and small polka dots and stripes?

We are so used to going into a shop, picking up a print from those hundreds of rolls of material and having our clothes made out of that material.

Let us go back in history. The making of textiles is one of the oldest crafts of the civilized community. Pre-historic man used animal skin for warm clothing. From leather and sheepskin, early man progressed to matting the fibre of the sheep's fleece together by pounding them with water. He even discovered that this could be cut to fit his body more easily than hard animal skin. Much later came the discovery of spinning and weaving the fibre of fleece. He also discovered that what could be done with wool could also be done with other natural fibre like cotton, linen and silk.

The Indian weaver joined together strips of grass to make his first garment. Then he progressed into making intricate designs by weaving various threads on a loom. The ingenuity of his mind and creativity of his hand have enabled him to weave the finest and most varied textiles available anywhere in the world.

## FIND WHERE I COME FROM

**Our country is famous for different weaves and designs that are typical of specific states or regions. Making of sarees in India constitutes a major part of the textile industry.**

**Identify as many different types of sarees as possible that exist in your family or neighbourhood. Add to the list given below:**

**Trace their origin.**

**Eg. Kanchivaram from Kanchipuram.**
**Patola from Orissa and Gujarat.**
**Chanderi**
**Tanchoi**
**Maheshwari**
**Ikat silks**
**Sambalpuri**
**Sanganeri**

In the ancient history of India, weavers occupied a place of honour. Harappan and Mohenjodaro sites have produced evidence of bobbins and madder-dyed cotton fabric. In Southern India, archeological sites at Paiyampalli have produced spindles made out of areca nut beads. In Kashmir, site excavation at Burzahom produced pottery which reveals the impression of woven mats, thus proving that weaving existed as a technique to produce textured sheet-like surfaces over 4000 years ago.

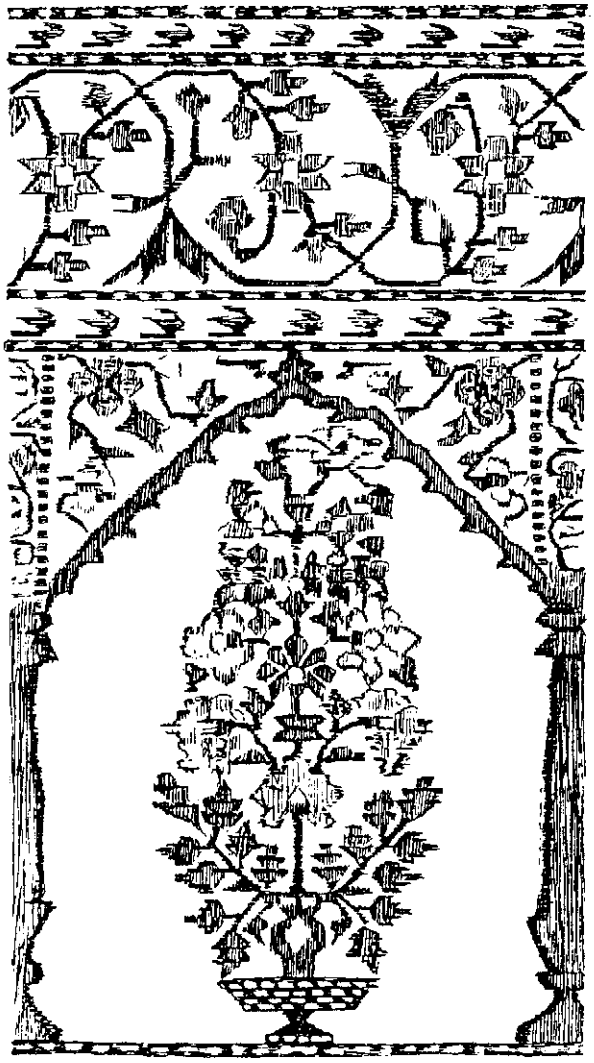
The various dynasties that ruled India, produced their own designs and textiles. In the Chola empire, the weavers lived inside the temple complexes and wove fabric for the idol, the curtain for the inner sanctum. They also wove clothes for the priests and the people of the locality as well as for trade across the sea.

During the Moghul period, hundreds of weavers were forever busy weaving brocades and finest muslin for the nobility both in North India and South of the Vindhyas. The weavers who came with the invaders brought their own unique techniques and further enriched the existing craftsmanship.

Indian woven textiles reached far and wide. Till 1800, no other country produced a greater amount of fabric than India. We were also the largest exporter of textiles in the world. It was trade in textile and spices that initially brought European traders to India in the sixteenth century colonization.

"From the coast of Coromandal to Bengal, it is difficult to find a village in which every man, woman or child is not employed in making a piece of cloth", noted a French traveller, Dubois.

We have always taken pride in our textiles. Hand block printing, painting on textiles and embroidery were our specialities. Exquisite silk and cotton, woven painstakingly with motifs were our inherent tradition.



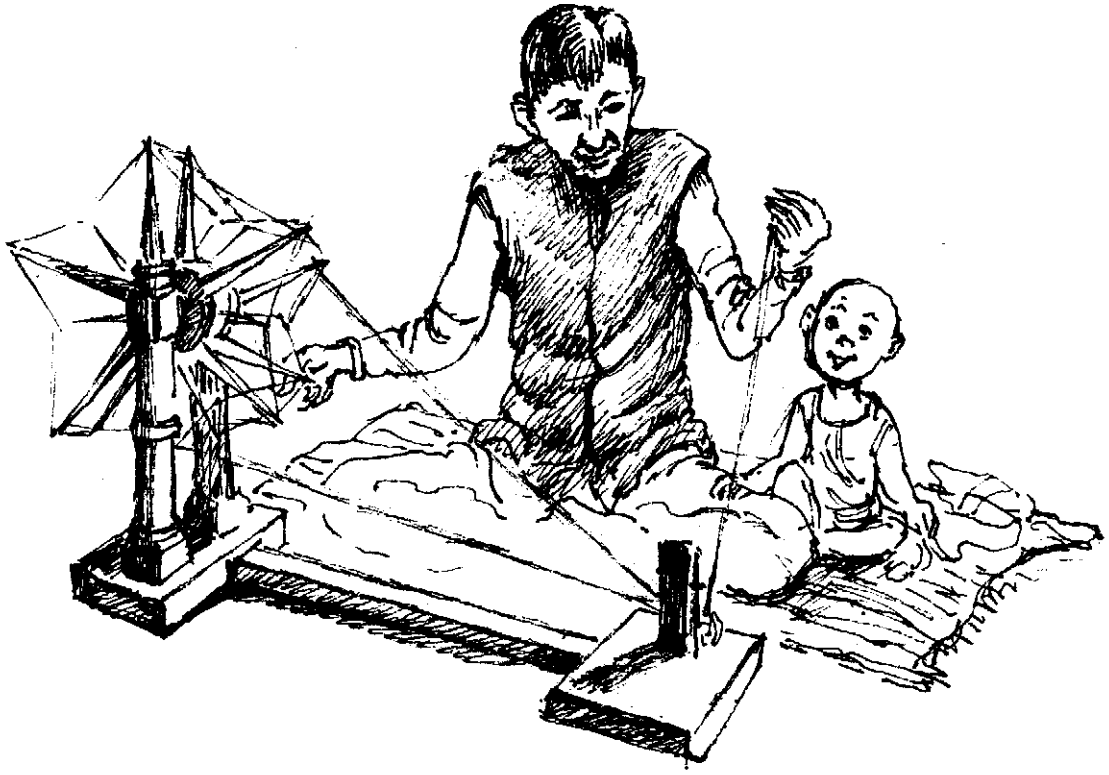
*Did you know that Napoleon's wife, Empress Josephine was the proud owner of 400 `Cashmere shawls`?*

## ETHNIC FASHION DESIGNER

**Different places in our country have different ceremonial dresses.**

**Design your own outfit keeping in mind the place - Rajasthan, Gujarat, Kashmir, tribal of Bastar, etc.**

**What would a man/woman wear in different parts of the country?**



The availability of resources and the climatic conditions determined the development of textile manufacturing and skills in different civilizations.

In hot climates, cotton and linen were the favourite materials. Fine linen was made in Egypt while cotton was first spun in India about 3,000 years ago. In the chillier climates of Northern Europe, wool was predominantly used. The British textile industry flourished by third century A.D. Silk manufacturing was an art kept secret by the Chinese for thousands of years before it spread first to Japan and later to Europe.

With the advent of the Industrial Revolution, everything changed. There were big textile mills employing hundreds of workers and producing thousands of metres of cloth everyday.

The position of the weaver deteriorated. No one wanted hand woven material. Everyone preferred textile straight from the mill. The mills of England -Manchester,Birmingham and Lancashire - almost wiped out the handloom weaver. During the freedom struggle, Mahatma Gandhi effectively used the `charkha' as a political weapon to emphasize self-reliance and independence. Hundreds of mill-made clothes were burnt, symbolizing the country's struggle for Independence.

## RISK AT WORK

The handloom weaver worked at home with help from his entire family. They did not suffer from any ill-effects when working with raw cotton, processing it, making it into yarn and then spinning it into fabric - at least, none that were recorded in history.

There must have been some hazards of working with cotton. However, the danger increased when machinery was used -both in cotton fields and mills. Earlier, cotton was picked by hand and woven by slow-weaving looms. Today, cotton is machine picked and woven in fast machines. The former produced big particles which flew out of the window while the latter produce fine particles that cannot be seen by the naked eye.

Machines, huge and throbbing, dark and dingy work places, humid and hot rooms, cotton fluff flying around, all of these caused major health problems.

What is this dreaded diseases called Byssinosis? As long ago as 1746 the first ever description of this disease was made by B. Ramazzani, a pioneer of occupational health in London.

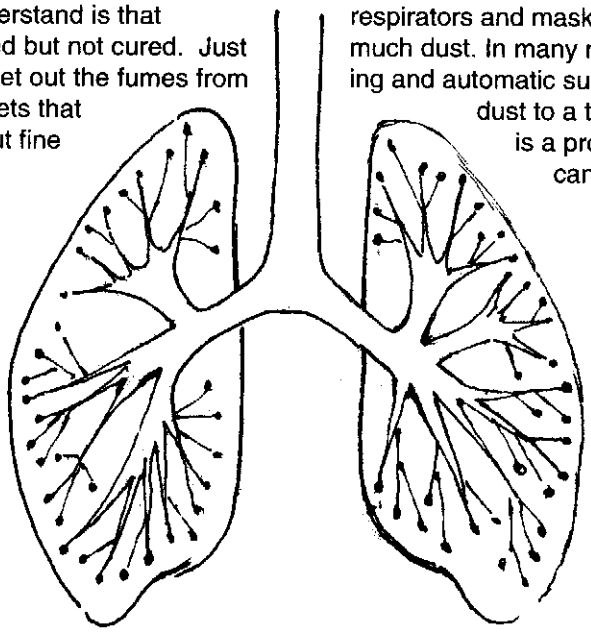
"Those who hackle in the flax and hemp to prepare it for being spun and woven, afford frequent instances of the unwholesomeness of their trade; for there flies out of this matter a foul mischievous powder, that, entering the lungs by the mouth and throat, causes continued coughs and gradually makes way for asthma...But in the long run if they find their affliction grows upon them they must look out for another trade; for it is a sordid profit that`s accompanied with the destruction of health."

In simple words, this means that the cotton dust gets into the air during the handling and processing of cotton. It is present wherever raw cotton is used. Raw cotton comes out not only from bales but also from floor sweepings and other wastes emanating from cotton processing operations.

Initially the workers do not connect the pain in their chests, the coughing and the shortness of breath with the air they breathe on the job. They can`t smell what is causing the disease. They can`t feel it. They can`t see it - even if they can see clouds of cotton in the air - but the dust that damages the lungs is too small to be seen by the naked eye.

## 1/4 of active textile workers have lung problems.

What is crucial to understand is that Byssinosis can be prevented but not cured. Just as we use exhaust fans to let out the fumes from our kitchen, there are gadgets that are capable of screening out fine and large dust particles. Workers, if provided with respirators and masks, would not have to inhale so much dust. In many mills in England, air conditioning and automatic suction machines reduce the dust to a tolerable level. Textile making is a profession where cotton dust cannot be totally eliminated -but the hazards of working with it can definitely be controlled.

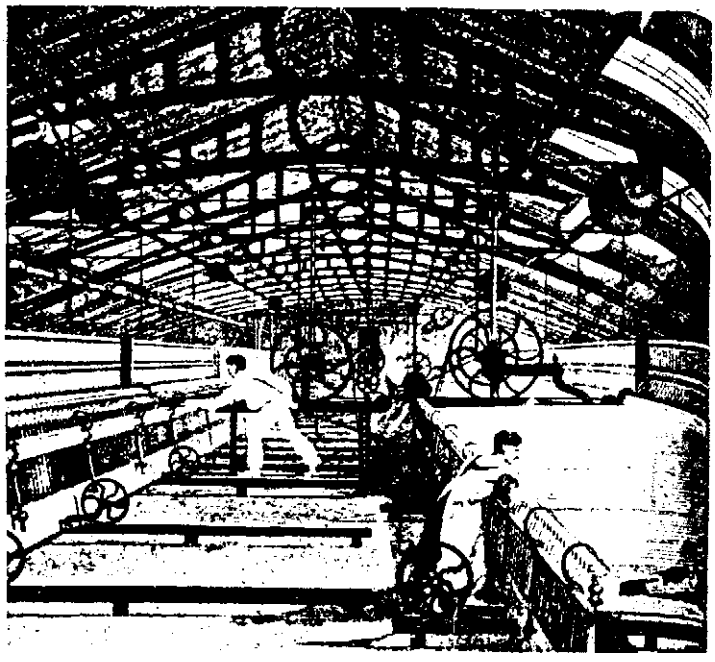


## *THE SONG OF THE SHIRT*

*Work-work-work*
*Till the brain begins to swim;*
*Work-work-work*
*Till the eyes are heavy and dim!*
*Seam, and gusset, and band,*
*Band, and gusset, and seam,*
*Till over the buttons I fall asleep*
*and sew them on in a dream!*

*O! Men, with Sisters dear!*
*O! Men, with Mothers and Wives*
*It is not linen you're wearing out,*
*But human creatures' lives!*
*Stitch-stitch-stitch,*
*In poverty, hunger, and dirt,*
*Sewing at once, with a double thread*
*A Shroud as well as a Shirt.*

*The Industrial Revolution caused poetic protests, the most famous of which was prompted by a London news report of the arrest of a seamstress for pawning articles belonging to her employer. Paid by the piece, she could earn at the maximum seven shillings a week.*



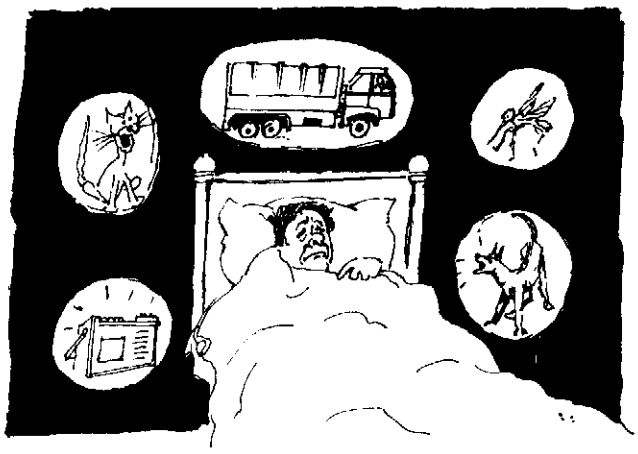
## NOISE

There are so many sounds that we hear in our day to day lives that makes us irritable. For eg., the buzz of a mosquito, the dripping of a tap, blaring car horns, the screech of chalk on a black-board, the rattling of windows when an aeroplane flies too low.

Noise can cause a lot of irritation. When road-building machines are working outside your house, you get irritated. The workers working on these machines have to bear this noise day in and day out. This causes not only a strain on the ears but mental stress as well. It results in headaches, lack of concentration, short temper. It can also cause heart disease, cancer, effect the sensory organs of balance and cause accidents, dizziness, loss of clear vision and night vision. And finally, it damages the ear irreparably.

This does not happen in one day but over a period of time so the worker does not even realise that he is losing his hearing.

Most people are frightened by chemical risks, yet noise can kill the delicate cells in your ear and turn you deaf. It is not loud bangs that damage hearing. Most hearing damage is caused by long exposure to noise that is loud but not so loud that you cannot get used to it. Such noise is common in industry.



When we visited a textile mill in Ahmedabad, the deafening sound of the various sections of the mill gave us a severe headache. We could not talk to each other in the mill, unless of course we shouted at the top of our voices. Think of the workers who work in this area who have got so used to the noise that they do not even realise that it exists or that it is causing a hearing impairment.

### *HOW IS THE DAMAGE CAUSED?*

*Human beings can cope with sounds of low energy. Even `quiet' industrial noise is much more intense than the noises of the natural environment. Exposure to intense noise wears out the cochlea fibres, they lose their sensitivity and eventually it destroys them completely.*

*The rate at which the noise puts energy into your ears determines the rate at which damage is done. A measure of this `rate of damage` is the intensity of noise. The measurement of this intensity is in units called db, short for decibel.*

| Effect on human beings | Sound level in dB(A) | Sound source |
|---|---|---|
| Highly injurious | 140 | Jet engine |
| | 180 | Rivet hammer |
| | | **PAIN THRESHOLD** |
| | 120 | Propeller plane |
| Injurious | 110 | Rock drill<br>Chain saw<br>Sheet-metal |
| | 90 | Heavy truck |
| Risk | 80 | Heavily-trafficked street |
| Speech-masking | 70 | Saloon car |
| Irritating | 60 | Normal conversation |
| | 50 | Low conversation |
| | 40 | Quiet radio music |
| | 30 | Whispering |
| | 20 | Quiet urban apartment |
| | 10 | Rustling leaves |
| | 0 | **HEARING THRESHOLD** |

## Have You Got A Noise Problem?

You may not think so - but find out by answering the following questions:

* do you have difficulty in hearing or understanding what is said at home, or at work?

* do you need the radio or TV turned up louder than the rest of the family?

* do you get frequent headaches or ringing noise in the ears?

* do you feel temporarily deaf after work - but not after a day or so while away from work?

* do you feel unusually tired or bad tempered by the end of the work shift?

* do you seem to get stomach complaints?

If the answers to these questions seem to be "Yes", then most probably the noise in your work place is to be blamed for it.

## Rayon Factory in Nagda.

Gwalior Rayon Silk Mills, Nagda, Madhya Pradesh, is one of Asia's biggest rayon manufacturing units, directly employing 5,000 people.

The factory is full of toxic materials like Carbon Disulphide, Hydrogen Sulphide, Sulphur Dioxide, Chlorine and Mercury vapours. After a year of work at the factory, the worker starts suffering from giddiness, headache, memory defects, loss of sensation and other problems. Serious ailments, ranging from paralysis to psychosis have affected hundreds of workers. In 1982 alone, 23 workers died of mercury poisoning. Many more have become impotent. The suffering continues even today.

Everyday the factory discharges about one lakh litres of waste water containing highly toxic chemicals into Chambal river. The presence of mercury in the water was found to be as high as 0.25 gram per litre which is 250 times higher than the permissible limit laid down by the World Health Organization(WHO).

## SOUND POWER

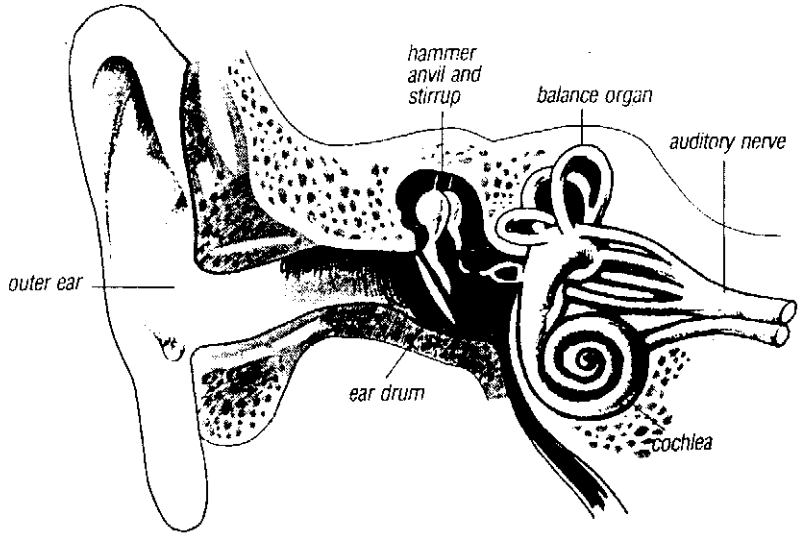
**Hang a strip of tissue paper in front of the loudspeaker of a sound system. Shut off the sound, close all doors and windows, switch off fans and air conditioners in the room. The paper should hang motionless. Now switch the sound on and turn up the volume. See the effect of the sound on the paper. Write down your observations.**

## QUIET SOUNDS

**Find a quiet corner either in a room or out in the garden. Listen to the sounds around you. The rustling of a newspaper, whirring of a fan on the ceiling, scratching of a nib on paper, turning the pages of a book, sounds from a kitchen.....and so on.**

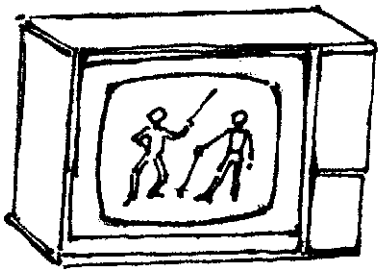
**Write a poem/ prose passage on what effect this sound had on you.**

**There are so many workers who just cannot hear these sounds; sounds that we take for granted in our day to day lives.**



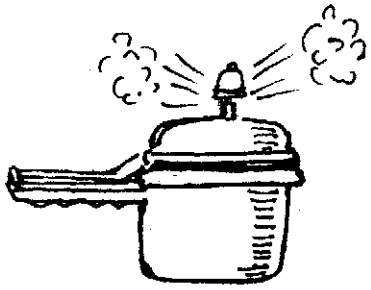

## HOW EARS WORK

Sound energy is transmitted through the air from the source of the sound to your ears. When it reaches your ear, the sound energy makes your eardrum vibrate. This is then transmitted to the cochlea through three small bones. The cochlea is full of fluid and lined with thousands of tiny sensory fibres. The sound energy travels through the fluid, reaches the fibres and makes them vibrate. The fibres are connected to your brain by nerves and send a signal to your brain, which is how you hear.



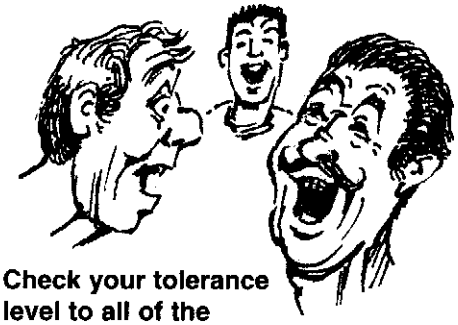
**Switch on your T.V. at a loud volume**

**Let the pressure cooker hiss**



## DRIVE YOURSELF DEAF

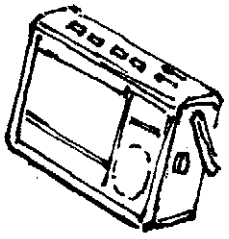
**At home, when you are involved in so many activities, do you ever think of the damage you may be causing to your ears? Do the following simultaneously:**

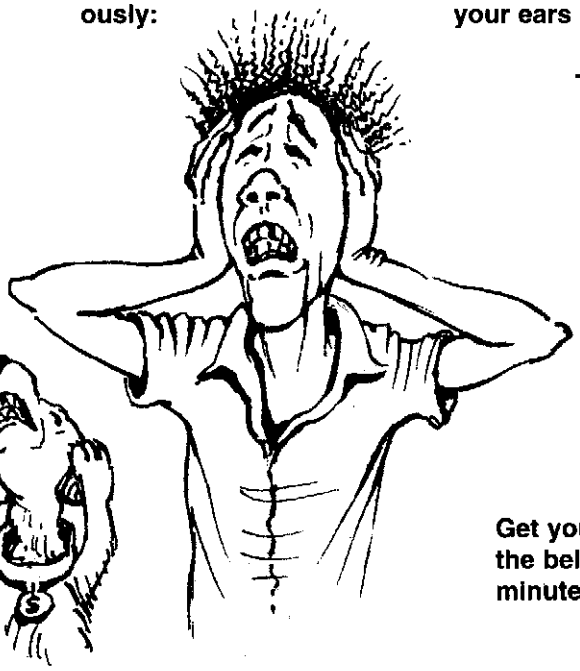


**Check your tolerance level to all of the above. Check how long it takes before your ears `give up'.**

**Allow your alarm bell(not a quartz but a winding one)to ring**

**Talk on the phone**





**Encourage someone to whistle with a plastic whistle**

**Similarly, think of other things in your day to day lives which may result in noise levels beyond a healthy point.**

**Switch on your cassette player and play rock music loudly**

**Get your friend to ring the bell non-stop for 2 minutes**

## SHIFT WORK

Imagine sleeping in the morning and getting up at night and going to work when everyone else is ready to go to sleep. Or getting up in the afternoon and going to work.

In industries where machines run for 24 hours, where there are no Sundays or holidays, there are teams that keep changing shifts 24 hours a day. In India there are 3 shifts - and the timings vary from industry to industry. The workers change their shift every week. There are instances where the shifts are changed every three days also. Accidents occur when the worker falls asleep during a shift because the natural bio-rhythm of the body has been disturbed.

The workers suffer from shift-lag. This is similar to `jet-lag` which is a common feeling for travellers flying across time-zones.

The shift-lag is a very serious condition because the slightest mistake can cause damage to life, limb or surrounding areas through improper handling of machinery, a wrong move on the machine, slowed down reactions, etc.

An experiment was conducted on 14 guinea pigs. They were flown from London to San Francisco. It took them four to five days to recover their full mental equilibrium. After the flight out, it took four days for sleep patterns to settle down and after the flight back, six days.

Our body clock is set to a certain programme when we are children. It is difficult to change the clock around at will. Shift work implies that everything changes according to the shift one is working on - meal times, sleeping times, interaction with the family, friends, etc.

From a study done, about one-third workers in any group can adjust their eating and sleeping habits within a few days of any one shift change. At the other extreme a large portion - 38 % in one survey - just cannot get used to it.

Workers complain of permanent tiredness, irritability and constipation. Continuous night work is most disruptive in maintaining social relationships. After a night-shift, the worker is expected to go home and sleep-to be ready for the next night-shift. But in reality, this does not happen. It is difficult to sleep when the sun is shining and the day has just begun. He cannot rest because the family has a different routine than him. The children go to school, household chores have to be done, there are the sounds of morning activities in a house that disrupt sleep. Just when the family members have come back home and they are ready to relax, the worker has to go off to work. It is very difficult to find time to meet friends. Family life also suffers because the workers may not be around for days on end.

## YOUR FAMILY AND SHIFT WORK

**Imagine that your parent(mother or father) works in shifts. Think of the following:**

* **What are the things you would miss out on a daily basis?**
* **When would you share your day's activities?**
* **When/how often would the family get together?**
* **Would you need to plan in advance if you want to talk to your parent?**
* **What would happen if a decision had to be taken immediately and one parent was away on duty?**
* **How would your other parent feel about his/her partner's shift-duty?**
* **How would your parent feel about being on shift-duty?**

**Write a piece on the above, bearing in mind all that you have read about shift-work**

### *Did you know ?*

** That the mynah was introduced into Mauritius from India in the 18th century to control a locust attack.*

** That everyday we consume over 40 times the amount of pesticides than the average American or Britisher.*

** That according to FAO estimates every hour one farmer dies of pesticide poisoning in developing countries.*

** That two of the three main causes of cancer in the US is the use of pesticides and pesticide residues in food they eat.*

** According to WHO estimates, one of every two acres of cultivated land feeds insects and pests. In India alone we lose agricultural produce worth Rs.5,000 crore annually, due to the ravages of pests.*

### What are pesticides ?

Very simply, chemicals used to kill pests - pests of any type - insects (most obviously), rodents, weeds, nematodes, mollusc and plant diseases.

It was with the introduction of the Green Revolution in India in the mid-60's that we began the use of pesticides on a massive scale to increase our agricultural production, and simultaneously to contain the problem of malaria.

Today, India is the second largest pesticide manufacturer in Asia, producing 65,000 tonnes per annum.

Along with the use of chemical fertilizers and improved irrigation, this increase in pesticide use resulted in a spectacular jump in agricultural production by 1980. In the same period the use of DDT in controlling malaria, resulted in a fall in the number of deaths due to malaria from 75,000 to 1,500 a year.

But the main problem with the use of pesticides is that they are toxic. This poisoning may occur in one of five ways:

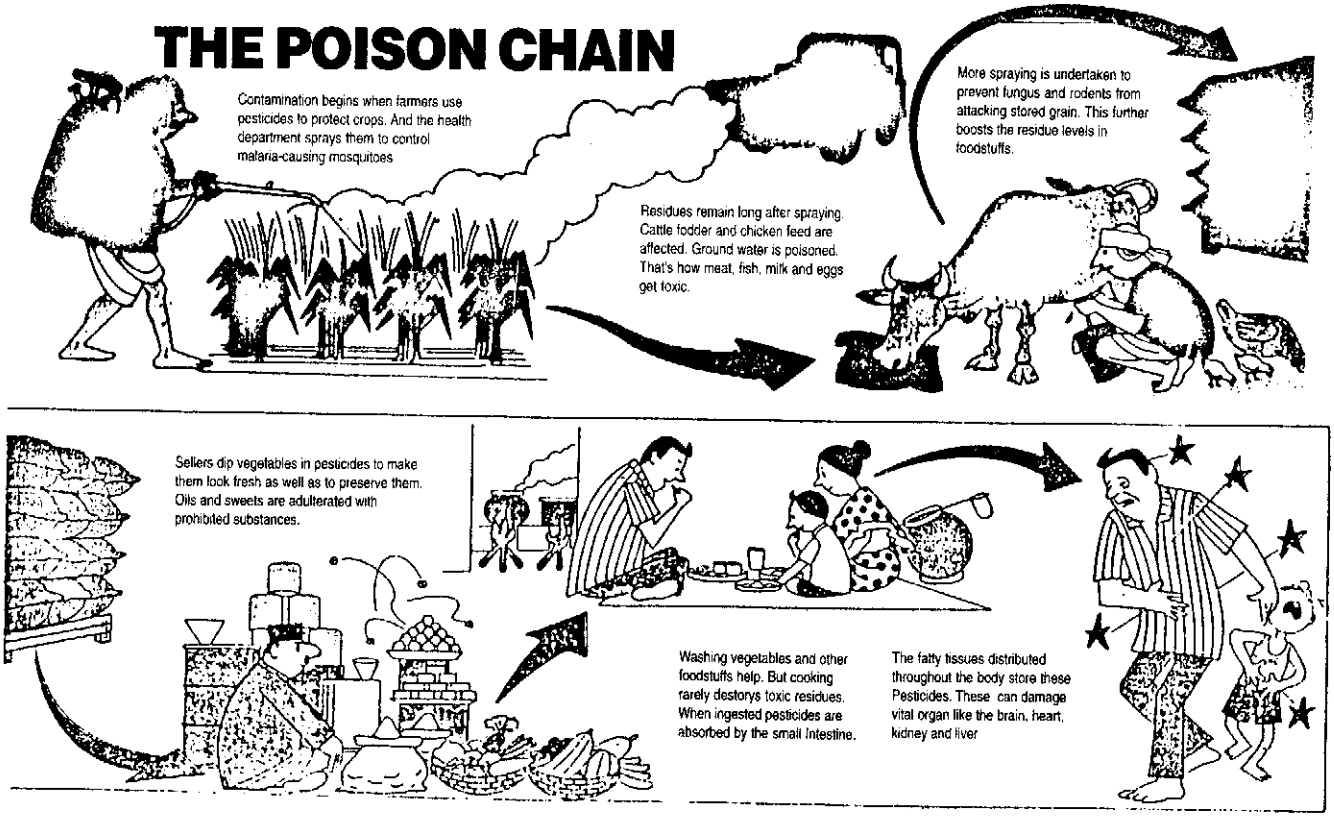
**1.** Direct poisoning from contact with the pesticide eg. most pesticides are poisonous not only to the pests they are intended to kill but for others too. For example the pesticide sprayed on a plant would be poisonous for bees as well, who play an essential role in pollination.

Fish too are highly susceptible to pesticides. As the run off from plants often enters a lake or river, fish may die in large numbers.

Another major result is that pesticides may affect some natural enemies that restrain pest population.

**2.** Indirect poisoning caused by eating poisoned prey - `secondary poisoning' - for eg. fish who feed on insects who have been killed by pesticides, are the second hand consumers of this pesticide. The famous `birdman' Salim Ali pointed out that the owl is extremely useful to farmers, because it preys on at least three rodents every night.

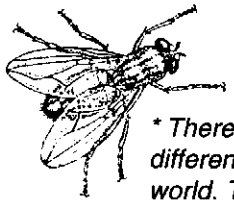
A pair of rodents produces seven hundred in a year. It is said that five rodents destroy as much as is enough to feed one person. So if the rodent is killed by a pesticide, and is then eaten by an owl-through the process of bio- accumulation, the owl dies due to pesticide poisoning.


THE POISON CHAIN
Contamination begins when farmers use pesticides to protect crops. And the health department sprays them to control malaria-causing mosquitoes
Residues remain long after spraying. Cattle fodder and chicken feed are affected. Ground water is poisoned. That's how meat, fish, milk and eggs get toxic.
More spraying is undertaken to prevent fungus and rodents from attacking stored grain. This further boosts the residue levels in foodstuffs.
Sellers dip vegetables in pesticides to make them look fresh as well as to preserve them. Oils and sweets are adulterated with prohibited substances.
Washing vegetables and other foodstuffs help. But cooking rarely destorys toxic residues. When ingested pesticides are absorbed by the small intestine.
The fatty tissues distributed throughout the body store these Pesticides. These can damage vital organ like the brain, heart, kidney and liver

**3.** Indirect poisoning caused by the accumulation of toxic pesticide residues in the food-chain - `delayed expression.' As much as 50% of a pesticide that is sprayed reaches the soil, is taken up by plants, moves into the bodies of invertebrates . This may occur in fish,birds and mammals. See cartoon strip above.

**4.** The danger with chemical compounds such as DDT, lindane and dieldrin lies in their tendency to collect in the fatty tissue of animals through the process of bio-accumulation. Any pollutants that are not excreted tend to build up within organisms, and are passed on through the food chain becoming concentrated in the top predators.

**5.** The incorrect use of pesticides also often prove to be lethal. For eg. a bunch of big leaves may be dipped into the liquid pesticide and then shaken over the plant. An animal may subsequently eat these leaves.... an empty pesticide container may be used to store water.....while the large pesticide packet contains safety information, often the farmer fetches his share in only a plastic bag.... spraying equipment may be washed in the same stream from where drinking water is taken .... the possibilities are endless.



** There are over one million different types of insects in the world. That is twice the number of all other kinds of animals put together! Many scientists believe there could be another two to three million species that have not yet been discovered!*

** The housefly lives for 7 days!*

** A cockroach can live for nine days without its head!*

** A wasp uses its sting to paralyse its prey. If the victim is too large to carry back to the wasp s nest (and a wasp can carry more than its own weight when in flight) the wasp can cut up the insect and carry it back, a piece at a time.*

The following two articles present two different aspects of pesticide use. The first presents the alternative: organic farming, that uses neither chemical fertilizers nor pesticides. The second is a horrifying true life story.

# RGANIC FARMING

ıvelling in Gujarat we came across an amazing farmer who lieves that:

* Chemical pesticides and fertilizers are unnecessary.
* Weeds and grasses are blessings, not enemies.
* Plants should be watered every 15 days.
* Earthworms should be encouraged and not destroyed.

Bhaskar Save's orchard of 700 trees of chikoo and coconut is where all of this is being tried out. He is totally opposed to the use of both artificial fertilizers and chemical pesticides. This entire farm is made up of earthen platforms about 16 feet wide.

He plants large trees (like coconut and chikoo) in the centre of these platforms. These are surrounded by medium life span trees like bananas and papayas. Each platform is surrounded by a trench, full of dead leaves and branches. These trenches are only watered once in every 15 days, a saving of upto 40% of the amount of water needed for irrigation. The rotting branches and leaves provide natural fertilizer, that is further augmented by the 21 lakh earthworms in this seven acre orchard. Every night each earthworm burrows in and out of the soil seven times each, leaving 14 holes and enriching the nitrogen, potash and phosphate content of the soil by its excreta. For every rupee he spends Bhaskar Bhai gets an income of ten rupees!

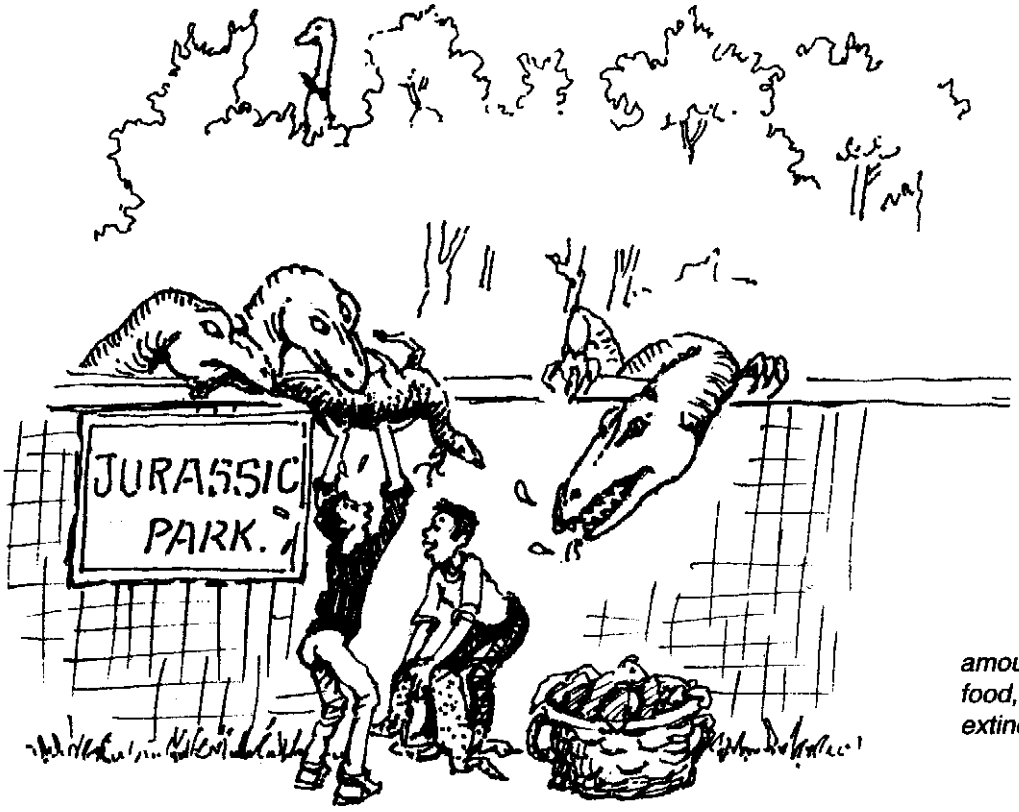
## SHIMOGA AND CHIKMANGALUR

In Karnataka's Shimoga and Chikmangalur districts since 1975, over 300 people have been struck by a mysterious crippling attack of arthritis.

Initial studies indicated that these people, mostly farm labourers, had switched to eating crabs from nearby fields after their wages were cut. These fields were being sprayed with pesticides regularly. And in the classic food chain link, the villagers who ate the crabs are believed to have been poisoned too.

Around the same time, an epidemic of epilepsy broke out in Lakhimur Kheri district in Uttar Pradesh. Around 250 people suffered from sudden convulsive seizures that racked the body. They complained of whistling noises in the ears, saw flashes of coloured lights and suffered from giddiness and headache. Reason: farmers in this area had been ignorantly using Benzene Hexachloride to preserve their food grain.

..... India Today, 1989




*" If we increase the amount of pesticides in their food, they'll soon become extinct again."*

The two examples given on the opposite page illustrate the point of how toxic a pesticide can be. Let us now see how spraying such a toxin can be an occupational health hazard to the agricultural labourer.

The King George Medical College in Lucknow did a series of tests on workers who regularly sprayed DDT and malathion. At least 50% of them had developed psychological symptoms like anxiety,sleep disturbance and depression. 20% had impaired memories, some suffered from damage to their eyes, and almost all complained of severe headaches.

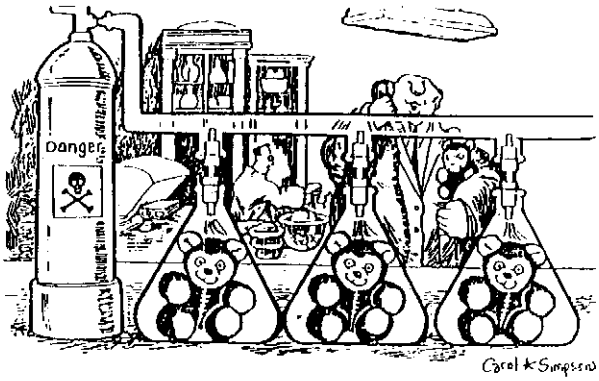
An even more tragic consequence of pesticides on human beings is their impact on children, even before they are born. A recent study of 15,000 births in two maternity hospitals in Jaipur, found that the two peaks seasons of brain defects coincided with the arrival of the rabi and the kharif crop in Rajasthan, crops that are highly contaminated by pesticides.

If these are the consequences of pesticides on the actual users and newborn babies, can you imagine the impact on the poor worker who produces them ?

The production of commercial pesticide includes two main steps - first, the active ingredients are manufactured - these are essentially toxic chemicals. The second stage is the actual formulation, making the chemicals into usable forms,either sprays or powders.

A pesticide company in Tamil Nadu that was recently studied, exposed its workers to pesticides in their liquid, vapour and dust form on a regular basis. The factory was situated in a residential area, and had no permission from the Pollution Control Board. There were no medical facilities available, and neither were periodic medical examination of the workers done. Further drums containing these high grade pesticides were found in the open area of the factory, without any warning notice.

Another study carried out by the National Institute of Occupational Health in Ahmedabad found that 73% of the workers at a pesticide plant had shown toxic effects.




*"The stuff's perfectly safe, we tested it on our animals. None show any iu effects whatsoever."*

*Keep in mind the statistic that the world pesticide industry produces half a kilogramme of toxic compounds for every person on the earth!*

A myth that is often put forth is that all of the pesticides in use in first world countries are tested in laboratories on animals, before they are actually used. However only 37 of the 1,400 pesticides in use in the US have been screened in this way, while in Britain untested pesticides are also widely used. Testing all of the pesticides currently in use in Britain will take another 40 years!

This is besides the point that testing on animals is not conclusive proof that the effects of the pesticide on human health will be the same. In fact Pfizer,one of the main manufacturing companies, has proved that less than half of the known cancer producing substances for humans, produced cancer in rats in laboratory situations. They felt that tossing a coin was as reliable a guide as carrying out such tests!

## DESIGN A BOOK JACKET

**Silent Spring', `Down to Earth', `Race to Save the Planet' are the titles of just some of the many books that have appeared in recent years, and helped to create an environmental consciousness. How about designing a book jacket for an imaginary new book, based on the facts and figures about pesticides you have read about in this chapter?**

**Follow these steps:**

**A. Use a sheet of paper cut to the size of an actual book jacket. Don't forget the two flaps, back and front, that hold the jacket in place.**

**B. The front cover needs to have an effective illustration on the theme, as you visualise it, with the title and the authors name forming an intrinsic part of the design. Invent a `reach out and grab' title, and design an illustration to go along with it.**

**C. The back cover can have a well written `blurb' that summarizes the book and helps to sell it.**

**D. The inside front cover can contain an exciting moment from the text. The inside back cover needs to have a write - up on the imaginary author.**

Other problems that go with laboratory testing is that they are tested one at a time - and not in the mix' or `cocktail' in which they are used in farms.

However, there is truth in the statement that many pesticides banned abroad such as DDT and malathion, are extensively used in third world countries such as ours.

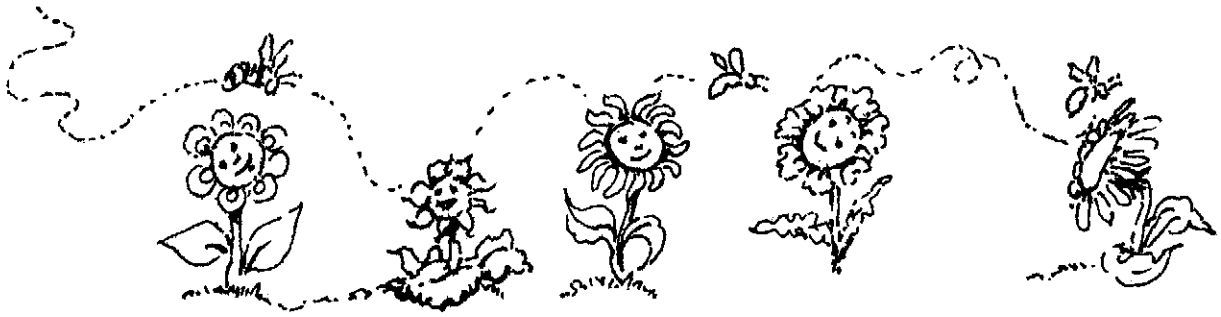
Also one needs to understand that pesticide poisoning is not only a problem of the third world, but is even more prevalent in the first world as they use three-fourths of all the pesticides currently being produced.

As an MP in Britain put it, "We know more about what's in a pair of socks, than what's in the food we eat."

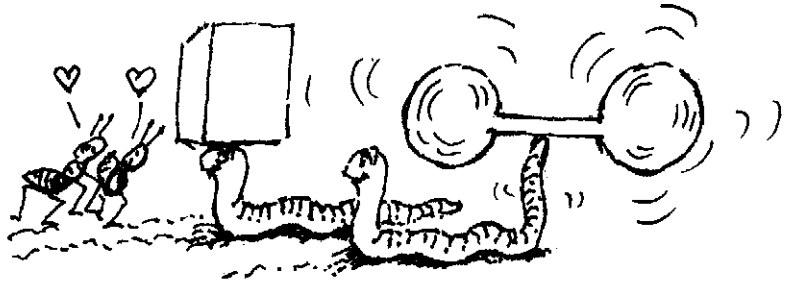
*`* A locust is one of the most dangerous pests. Locusts typically travel in swarms that number millions to each square kilometre. Each locust weighs 200 grams and consumes green leaves equivalent to its own weight daily.*

** I acre of farmland normally contains over 1 million spiders, million insects and 600 million mites.*

** A single bee would have to cover a distance of over 75,000 km in order to make 500 grams of honey.*



*'There is no such thing as pesticide free food any longer.'*
*U.K. Minister of Agriculture.*



Traditionally in all cultures there have been ways of keeping pests in check. After all, agriculture has existed for thousands of years. The mynah mentioned at the beginning of this chapter was just one example. Here are some more:

* Planting marigold alongside chilli plants, helps to ward off pests that would otherwise attack the chilli plant.

* Ladybirds were introduced to control pests in New Zealand, California and other countries in the 19th century.

* The steam sterilization of soil and hot water treatment of rice seeds at 52 to 55 degrees centigrade for 15 minutes can also be-very useful.

* Substances found in the seeds and kernel of the neem tree can repel as many as 70 species of insects.

Today, many of these old solutions and several new ecologically sound techniques are being used to control pests. A lot of new research in this area is being carried out in our own country.

* "Indiara" is a new, safe herbal insecticide developed in Pune and is prepared from garlic, onion and mustard - useful to contain mosquitoes and also to protect 40 crops.

* The guppy fish and the gambusia fish have been introduced into 3,800 wells and ponds in Hyderabad to eliminate mosquito breeding.

* Spraying is used to alter the hormones and confuse pests, making them unable to differentiate between male and female. Gamma radiation that sterilizes millions of male insects is also used as a pest prevention measure.

## ORGANIC PESTICIDES

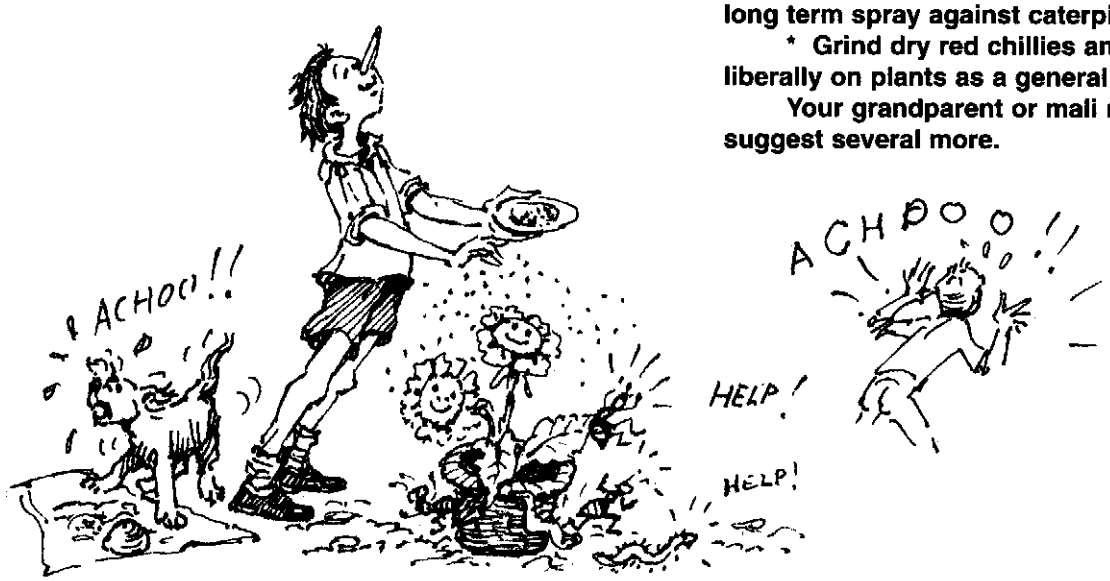
**How about substituting the pesticides you use at home or in the school by natural alternatives that will have no side effects? Try some of these in your garden.**

*** Grind custard apple seeds and then mix them with water. Spray this on your plants to keep ants, aphids and other insects at bay.**

*** Boil the stem and leaves of the tomato plant and let it cool. This makes an effective long term spray against caterpillars and flies.**

*** Grind dry red chillies and sprinkle it liberally on plants as a general repellant.**

**Your grandparent or mali may be able to suggest several more.**



## CASE STUDY : TEMIK

Temik. The name under which Union Carbide (yes, the people responsible for the Bhopal disaster) marketed the extremely toxic pesticide `aldicarb', that entered and poisoned ground water supplies in six states in the U.S.A. in 1982. This pesticide is used in 40 other states in America, and in 60 countries worldwide.

Temik's label indicates that it can be fatal if swallowed, absorbed by the skin, or inhaled as dust. Aldicarb knocks out cholinesterase, the chemical bridges that connect the nervous system. Humans poisoned by as little as one milligram of Temik for each kilogram of body weight suffer from nausea,sweating, muscular weakness and slurring of speech.

When a hue and cry was raised in New York State about this contamination, Union Carbide offered to install filters costing $1,200 each for every contaminated well. Simultaneously it went ahead with its sale of Temik both in the U.S. and abroad.

Once Temik enters the water table it may contaminate it for upto a 100 years.

Temik is only one of the 55,00 manmade substances that has been introduced into the environment in the past 50 years. 100 new chemicals are added every year, many of them medically unknown. Who is to test all these substances for safety?

***"A few of my neighbours share my belief that `As you sow, so shall you reap', and if you sow pesticides, you reap poison."***

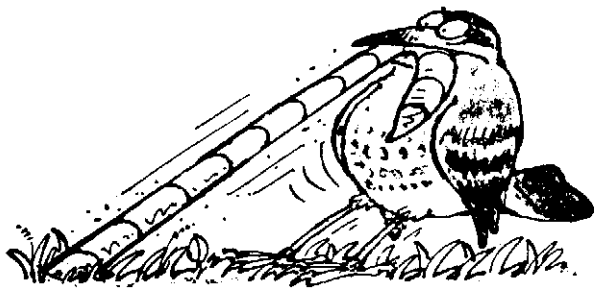
***Organic farmer, USA.***

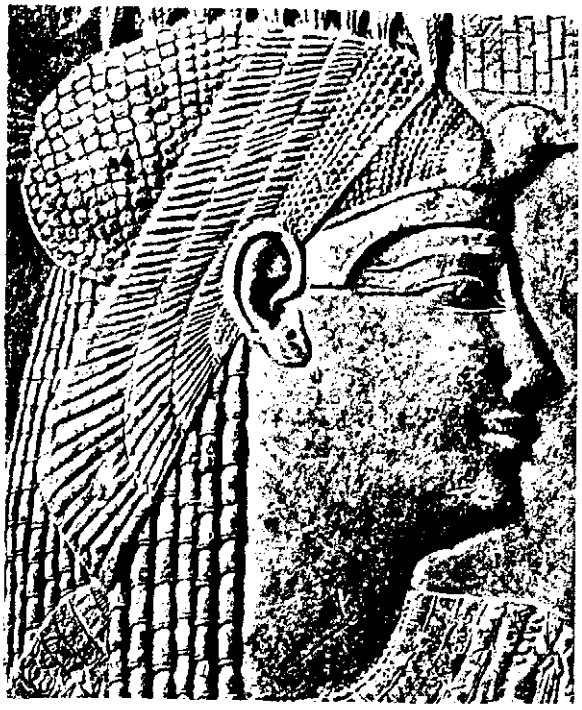
## THE BOLLWORM: COTTON PEST

The "bollworm" looks like a small green caterpillar, but is one of the biggest pests destroying cotton crops in India. During the four weeks of its larval life, the bollworm eats a phenomenal amount and then pupates itself to emerge as a light brown moth and continues its devastation.

If a single moth lays just one egg it could damage upto 820 kg. of cotton in a single season. However each moth lays between 500-1500 eggs every 2-6 days, and these reproduce rapidly, completing eight generations every year!

As pesticides are proving to be ineffective in controlling the bollworm, integrated pest management (IPM) is being tried. Fourteen birds have been identified that eat bollworms, and it is also suggested that crops such as bajra, soybean, maize and chillies be planted alongside the cotton, as the bollworm hates these plants. Another approach is to inter-crop cotton with onion, black gram and green gram on which the pest prefers to lay its eggs. The eggs can then be destroyed by breaking off the leaves on which the eggs are laid.





**ANCIENT EGYPTIAN RECIPE** (dating back to 2,500 B.C)
Ingredients needed:

| | |
|---|---|
| Sand | 4 parts |
| Soda Ash | 1 part |
| Limestone | 1 part |

Mix all the above together and cook at a temperature of 1800 degrees centigrade. The result will be a thick syrup of hot glass.

Fashion as desired into beads, jewellery and other decorative items of clear glass.

Add silver to create an exquisite amber.

Cobalt salts for the purple blue hue.

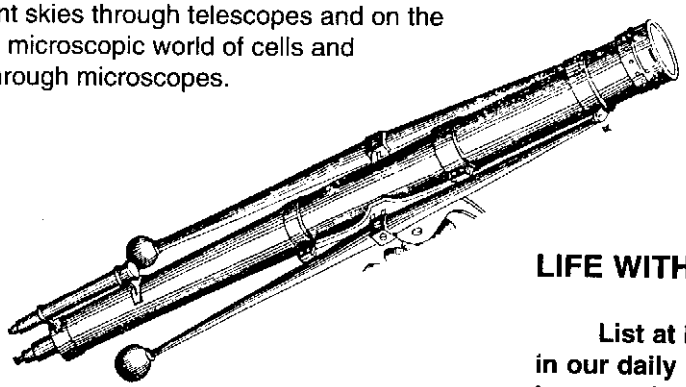
Ferrous oxides for olive green.

Chromium salts for chrome green that catches and reflects the sunlight.

This same basic recipe of the Egyptians is used even today. The versatile glass can be cut into sparkling items, rolled into sheets and blown to form the most exquisite art objects and even drawn to make fine wires, tubes and fibres. It can be formed into unlimited shapes, sizes and textures - from a tiny shining bead on a doll's dress to the walls of a building that catch and reflect the sunlight.

In today's world we cannot live without glass. It has helped light the darkness,sharpen the vision, transmit electronic signals across the universe and transform the world through computers.

It has, on the one hand, extended our vision to the distant skies through telescopes and on the other to the microscopic world of cells and microbes through microscopes.



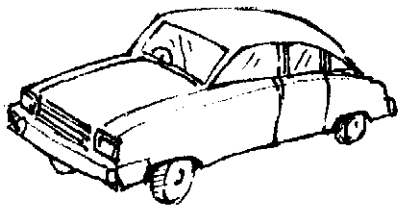
## LIFE WITHOUT GLASS

**List at least twenty different uses of glass in our daily lives, which cannot be substituted by any other material.**

Glass consists essentially of silica which is a major constituent of sand. But to melt sand and obtain silica is an expensive process. This is because the melting point of sand is 1800 degrees centigrade and so huge amounts of fuel would be needed to melt it.

However with the addition of 25% sodium oxide, obtained from soda ash, lowers the melting point of sand to 850 degrees centigrade. But the glass obtained from this combination is easily soluble in water. This proves that glass is not a solid. It is in reality a very thick and super cooled liquid.

To overcome this problem lime or limestone is added and once again the glass becomes insoluble. But as mentioned earlier, this silica glass, as it is called, is brittle and breaks easily making it unsuitable for optical glass and other purposes.



***Let us examine what the other kinds of glass are:***

***PLATE GLASS*** *is used for shop windows and doors. It has an extremely smooth surface. This is done by floating a layer of molten glass over a layer of molten tin. As the surface of tin is smooth, the glass over it becomes the same.*

***SAFETY GLASS*** *is produced from plate glass. The plate glass is first heated and then both its outer surfaces cooled by jets of flowing cold air.*

***BULLET PROOF GLASS*** *is even stronger than safety glass and is produced by binding several layers of safety glass with a transparent adhesive. The more the number of layers of the glass, the greater the strength. This is used in airplanes, car windshields and bullet proof screens.*

***HEAT RESISTANT*** *GLASS is used in laboratories, factories, kitchens and ovens. This does not crack when exposed to boiling water or high degree of heat eg. baking. This glass is made by replacing the soda ash with boric oxide and sometimes by alumina. This glass is known to us by the brand names of Corning, Borosil and Pyrex.*

***OPTICAL GLASS*** *is specially prepared to be free of all defects and is used in making spectacles, cameras, prisms, binoculars and other optical instruments.*

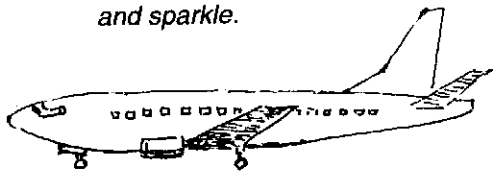
***PHOTO CHROMATIC GLASS*** *is used to make spectacles that darken when the wearer goes out in the sun and returns to its original lighter shade when the intensity of light decreases. This is due to the presence of silver iodine.*

***LEAD CRYSTAL GLASS*** *is a very special type of glass made by the addition of lead oxide. It is used for high quality art objects and expensive glass-ware. The surface of lead glass objects is often cut into decorative patterns to reflect light. The lead causes light to further reflect or bend separating out colours such as red and green. That is why cut glass chandeliers and similar objects have such extraordinary brilliance and sparkle.*

***GLASS WOOL*** *is used for insulation.*

***FIBRE GLASS*** *is a substitute for metals used in airplane wings, boats and storage tanks.*

***OPTICAL FIBRES*** *are thin flexible devices that are inserted into the body to give doctors living pictures of internal organs. This has radically transformed diagnosis and treatment by transmission of light signals.*



## MAKE YOUR OWN KALEIDOSCOPE

**Use pieces of bangle to make a colourful kaleidoscope. All you have to do is shake it and beautiful patterns form,one after another.**

**You will need:**

**sharp pencil**

**cello tape**

**scissors**

**card and tracing paper**

**three 6" x 2" mirror strips**

**bits of broken glass bangles**

**a torch**

**1. Holding the mirrors upright, with the shining sides inside, form a triangle.**

**2. Tape the three mirrors together.**

**3. Place this upright on the card, and draw around the base to form a triangle.**

**4. Cut out the triangle. Make a neat hole in it's centre.**

**5. Tape the triangle to one end of the mirror.**

**6. Stretch the tracing paper over the other end of the mirrors, Tape it firmly in place.**

**7. Drop the pieces of coloured glass bangles through the hole.**

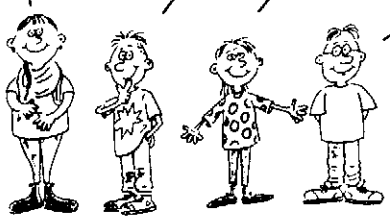
**8. Shine the torch onto the tracing paper and look through the hole into the kaleidoscope. You see a beautiful pattern of the pieces of bangles emerge. Shake the kaleidoscope to change the pattern.**

*Fear of a possible health danger from lead in glasses and decanters has made the famous Water Ford crystal company apply a polymer coating to the inside of these objects to bring the level of lead on the surface to an almost undetectable level.*

*A single machine produces bulbs at the rate of 66,000 an hour, as compared with 1,200 a day produced by a team of four glassblowers.*

*7,000 bulbs can be packed naked in a single wooden carton with no protection but a light coating of lubricant on each bulb.*

*Glass helps patients of liver tumour. Beads one third the thickness of a human hair, carry radiation directly to the tumour.*



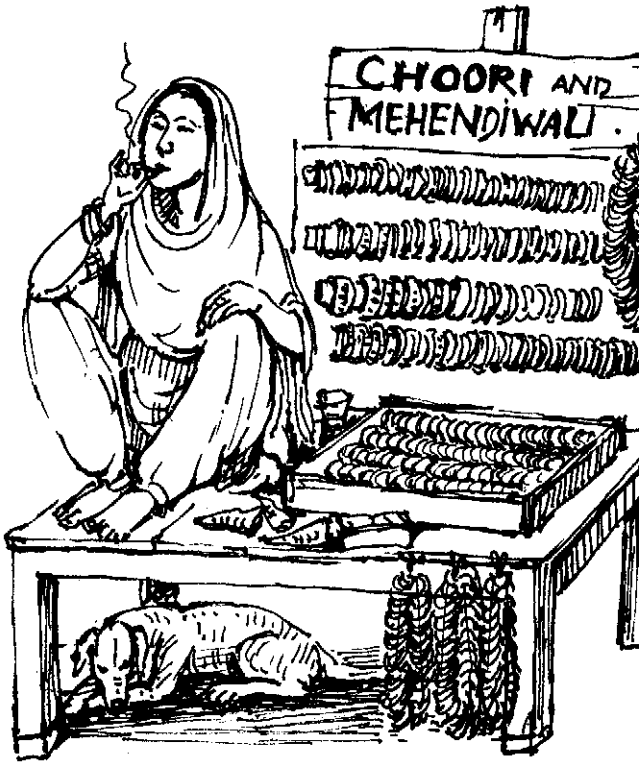
India is the largest manufacturer and exporter of glass bangles in the world.

We are all familiar with the sight of piles of bangles in shops and roadside stalls, especially during festival times.

The auspicious red and green bangles etched with the finest gold designs are proudly worn by brides all over the country.

In fact, glass bangles are an important accessory of an Indian woman's wardrobe and every saree has matching bangles.

But do you know that in the process of making the bangles some of the workers are in danger of losing their eyesight either because of heat cataract or a bit of glass flying into their eye?



FIROZABAD is the heart of the glass industry and is known as the TOWN OF CHIMNEYS. Even during the day, a cloud of dust hangs over the town which is caused by chemical fumes, soot and coal dust.

Every day this industry produces bangles, utensils, electric bulbs and decorative objects worth nearly Rs.50 lakh.

It takes a series of complicated steps and high risks to the workers' lives to produce each glass bangle or decorative item that we use.

At every stage workers are exposed to different hazards, against which they are not provided any protection by their employers.

Of all the glass items produced, the bangle industry is the largest and employs the maximum number of workers in factories as well as in their homes.

## REUSE BROKEN GLASS

**Collect broken bangles or buy inexpensive bangles and break each bangle into two or three pieces.**

**Be careful and avoid getting cut.**

**Wear protective glasses to help prevent pieces from flying into your eyes.**

**Sit in a room without a fan and make sure there is no ventilation. Light a candle and place it in front of you. Hold the two ends of the broken bangle and heat the centre over the flame. Slowly bend the bangle till the ends meet.**

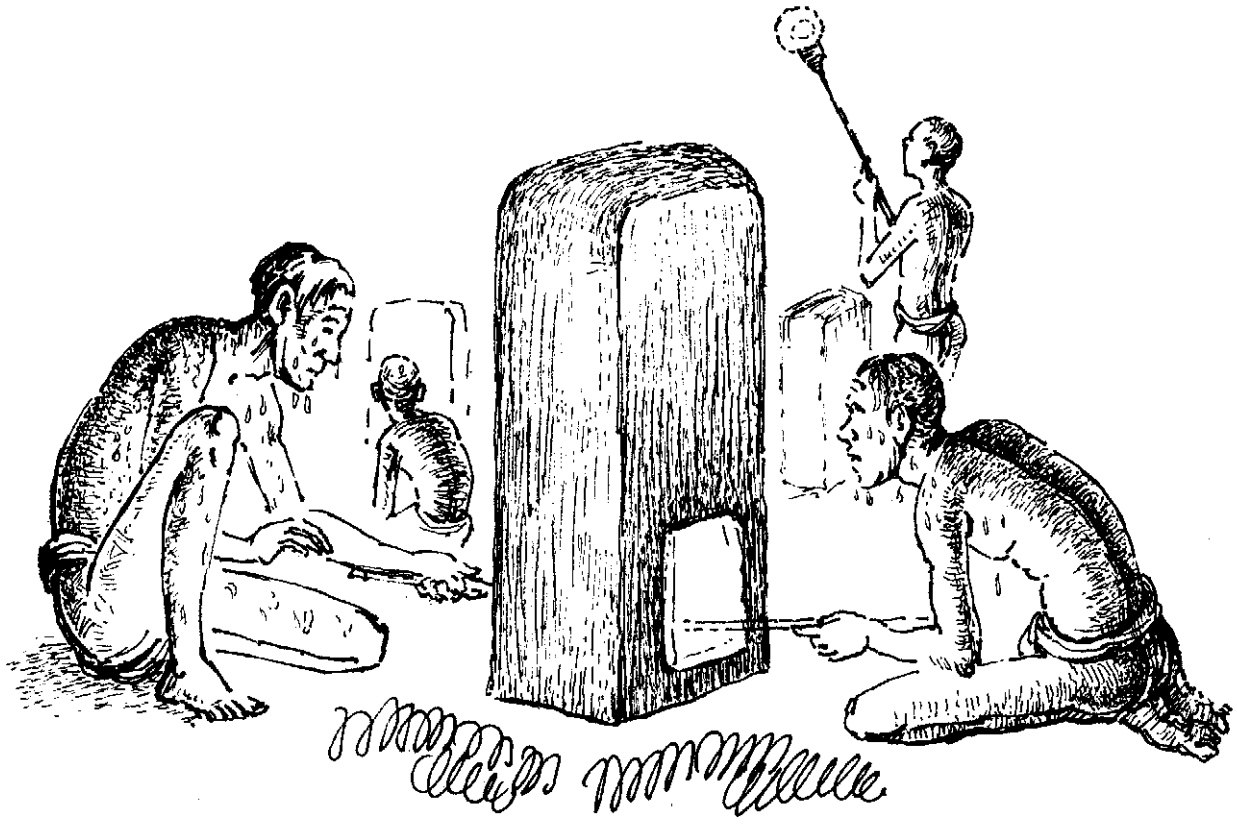
**Take another piece, slip it into the first joined piece. Hold the two ends of the second piece and place the middle over the flame. bend and join the two ends. Repeat these steps until you have a long chain made from the pieces of bangle.**

**You may use this in several ways; as a garland, over a doorway, on a mirror. Or you may make several long pieces, attach them to a wire spring and use as a curtain.**

This image portrays the life of the average person in the town of Firozabad. From childhood to adulthood it is the same routine. There is no escape: not for this generation nor for the next several to come!

*A common saying in the town of Firozabad:*

*"A BANGLE PASSES THROUGH A HUNDRED HANDS BEFORE IT FINALLY REACHES THE WRIST OF THE PERSON WEARING IT."*



Let us see the stages that a bangle goes through before it is finally completed.

**SORTING** Workers sit outside the tin shed of the factory sifting stones from the silica powder, handling soda ash and limestone. They do not wear protective gloves while handling these raw materials; nor do they wear protective face masks which prevent them from breathing in silica dust. As a result most of them suffer from T.B. and silicosis.

**MELTING** All raw material is put into a huge underground furnace(Bhatti)in special pots. This furnace is heated for twelve continuous hours,the temperature going upto 1500 degrees centigrade. Workers keep a round the clock vigil on the boiling glass and remove stray pieces of coal which may fall into it.

**CARRYING THE GLASS** The red hot molten glass has now to be transported to another part of the factory. This is done in a most primitive manner by workers,especially young children who are known as `battiwalas'.

The molten glass, the consistency of which resembles melted toffee, is wrapped around an iron pole (labia). To do this the worker has to go close to the fire and dip the five foot iron pole into the furnace several times before the required amount of glass gets wrapped around it. These rods with their lumps of red hot glass are then carried over to the next worker.

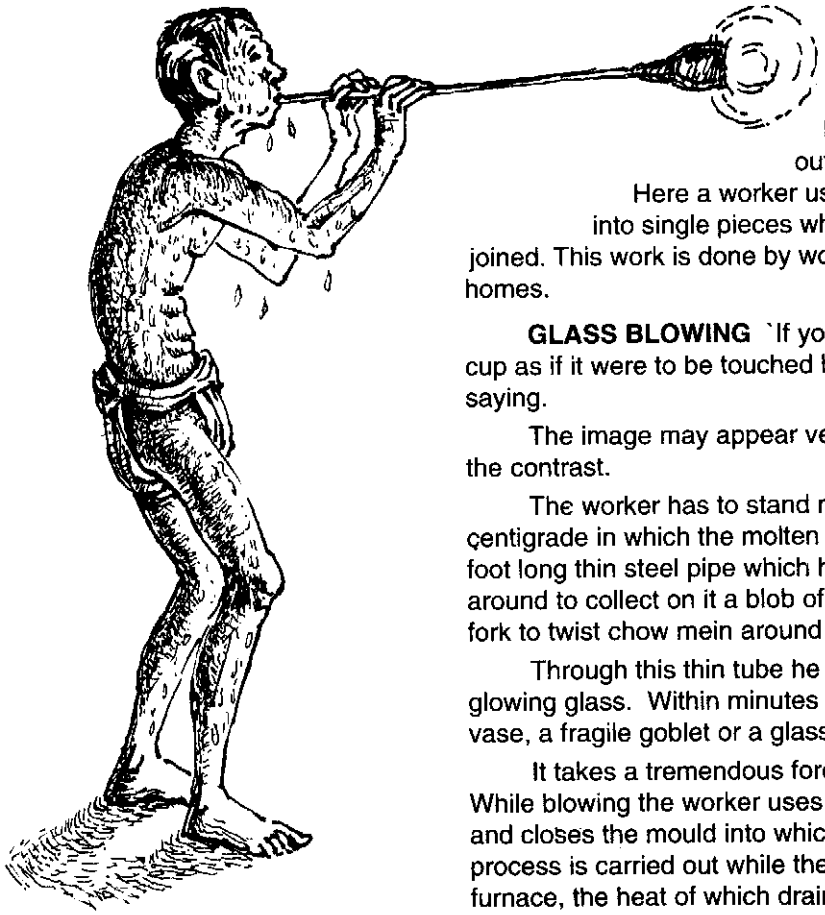
**SHAPING** This is the most skilled work in the bangle industry.The worker takes the rod with the molten glass and with the help of another rod touches it to a horizontal pole placed over a furnace.

This horizontal pole is kept revolving continuously by two workers who are known as `belanwalas'.

The worker has to be adept at this work and make sure that when the rod touches the revolving pole it pulls out only a fine thread of glass, so that the bangles produced are of an even and fine consistency.

This lump of glass is quickly pulled and spun into a long spring like coil of uncut bangles.

While the pole is spinning, one worker prevents two glass coils from joining each other by separating them with a sharp rod. A second worker removes the coils and a third worker makes a large bundle of many such coils.



**SEPARATING** The large bundles of coils are then taken outside the tin shed of the factory. Here a worker using a glass cutter separates them into single pieces which have yet to be aligned and joined. This work is done by women and young children in their homes.

**GLASS BLOWING** `If you are a blower of glass, fashion the cup as if it were to be touched by the lips of your beloved.' Old saying.

The image may appear very romantic but the reality is quite the contrast.

The worker has to stand next to a furnace of 1500 degree centigrade in which the molten glass is boiling. He takes a five foot long thin steel pipe which he dips into the mass and twirls it around to collect on it a blob of molten glass. (Just like we turn a fork to twist chow mein around it.)

Through this thin tube he blows on the thick crude lump of glowing glass. Within minutes this is transformed into a beautiful vase, a fragile goblet or a glass tumbler that we use everyday.

It takes a tremendous force to blow the glass into shape. While blowing the worker uses his foot to press a lever that opens and closes the mould into which he shapes the object. This entire process is carried out while the worker is standing next to the furnace, the heat of which drains him of his energy.

## THE HAZARDS

Imagine a hot summers day. It is 40 degrees centigrade and you have to walk from the bus stop to your home carrying a heavy bag.

It is only a 15 minute walk, yet it seems to take forever to complete.

Sweat pours down your body, your eyes squint against the hot sun and your arms feel as if they will fall off with the weight of the bag.

At long last, you reach home. You rush for the fridge: cold water, a soft drink. You flop down on the sofa: the fan, the cooler both seem insufficient. The curtains are drawn. You feel you cannot even lift a finger for a long time.

But you recover in forty minutes, do your homework and are ready to play tennis in the evening.

Now imagine the same summers day.Compared to the inside temperature it is a cool 40 degrees centigrade outside! The air in the factory shimmers with heat. Workers sit in front of furnaces of 1500-1800 degrees centigrade, their bodies pouring with sweat. The noise, the fumes and toxic gases, the strain on the eyes from peering into the orange red molten glass. There is no break, the body has to be in perpetual motion: walking, turning the `belan',shaping the glass. The eight hour day is like eight years of the workers life.

Many of them die by the age of forty.

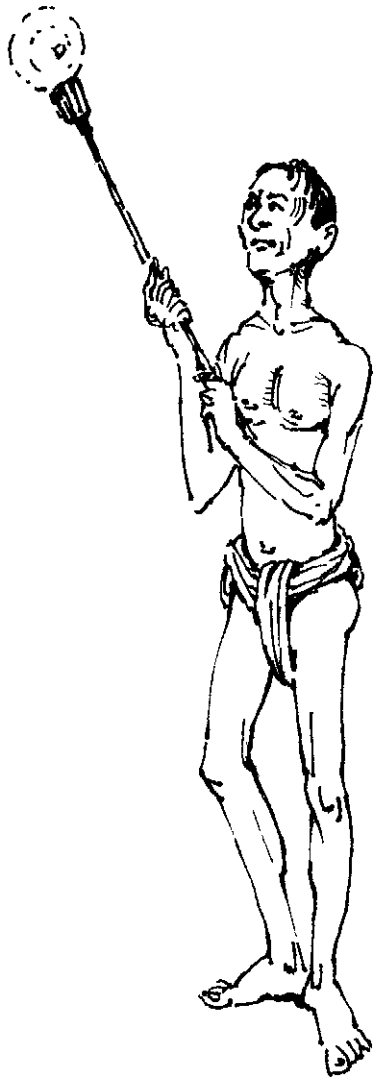
The greatest hazard of working in the glass industry is the terrible heat that the body is exposed to. There is no respite from it. Facilities are non existent or at the most poor.

No fans, no exhausts, no cool water to drink, no short breaks, no bathroom or shower where the worker can have a quick refreshing wash.

The workers are not provided with a protective uniform against the heat. They should wear thick clothing to prevent scorching their bodies. Instead they wear the minimum of clothing, which further exposes them to the heat.

They are not given protective glasses to prevent pieces of glass from flying into their eyes or to minimize the glare from the furnaces or pots of melted glass.

A prolonged exposure to heat of this kind can cause various grades of skin burn and worse still irreversible damage to the eyes.



## Too much heat can also mean

- fatigue
- extra strain on heart and lungs
- dizziness and fainting
- heat cramps due to loss of water and salt through excessive sweating
- dry air causing increased risk of eye and throat infection
- accidents from tiredness and loss of concentration
- heat stroke above a blood temperature of 102 degrees fahrenheit.

Collapse can occur above 106 degrees fahrenheit with symptoms of delirium and confusion. This condition can prove fatal and survivors can suffer from brain/ kidney/ liver/ heart damage.

*People in desert countries wear thick robes during the day to protect themselves from the tremendous heat.*

## WHO ELSE HAVE `HOT' JOBS?

**Bangle making is one of the few jobs that entails work in the most extreme kind of heat. Yet there are also other people who work in conditions of extreme heat. Can you think of who they are?**

**Do you think their job conditions expose them to some of the diseases and hazards mentioned? Which would these be?**

## OTHER HAZARDS

Apart from the tremendous heat and its related strains and pressures, the workers face other risks as well.

These include breathing in the silica dust, toxic fumes and inhaling coal dust. A majority of the workers suffer from silicosis which leads to T.B. The dry air and heat further aggravate this condition.

Workers getting burnt is a common occurrence. This happens when they stand too close to the furnace or when one worker carrying a rod of molten glass, accidentally bumps into another worker.

Getting cut is yet another hazard that the worker faces as the floor is strewn with bits of broken glass.

## BEAT THE HEAT

**A refreshing drink for someone who is either going out into the sun or has just returned from outside.**

**You need :**

**2-3 green mangoes**
**a bunch of fresh mint leaves, ground to a paste.**
**3 tbsp sugar**
**a pinch of salt**
**jeera powder (optional)**

**Boil the green mangoes after peeling their skins.**

**When they have cooled, remove the pulp and pass it through a sieve to remove the fine threads.**

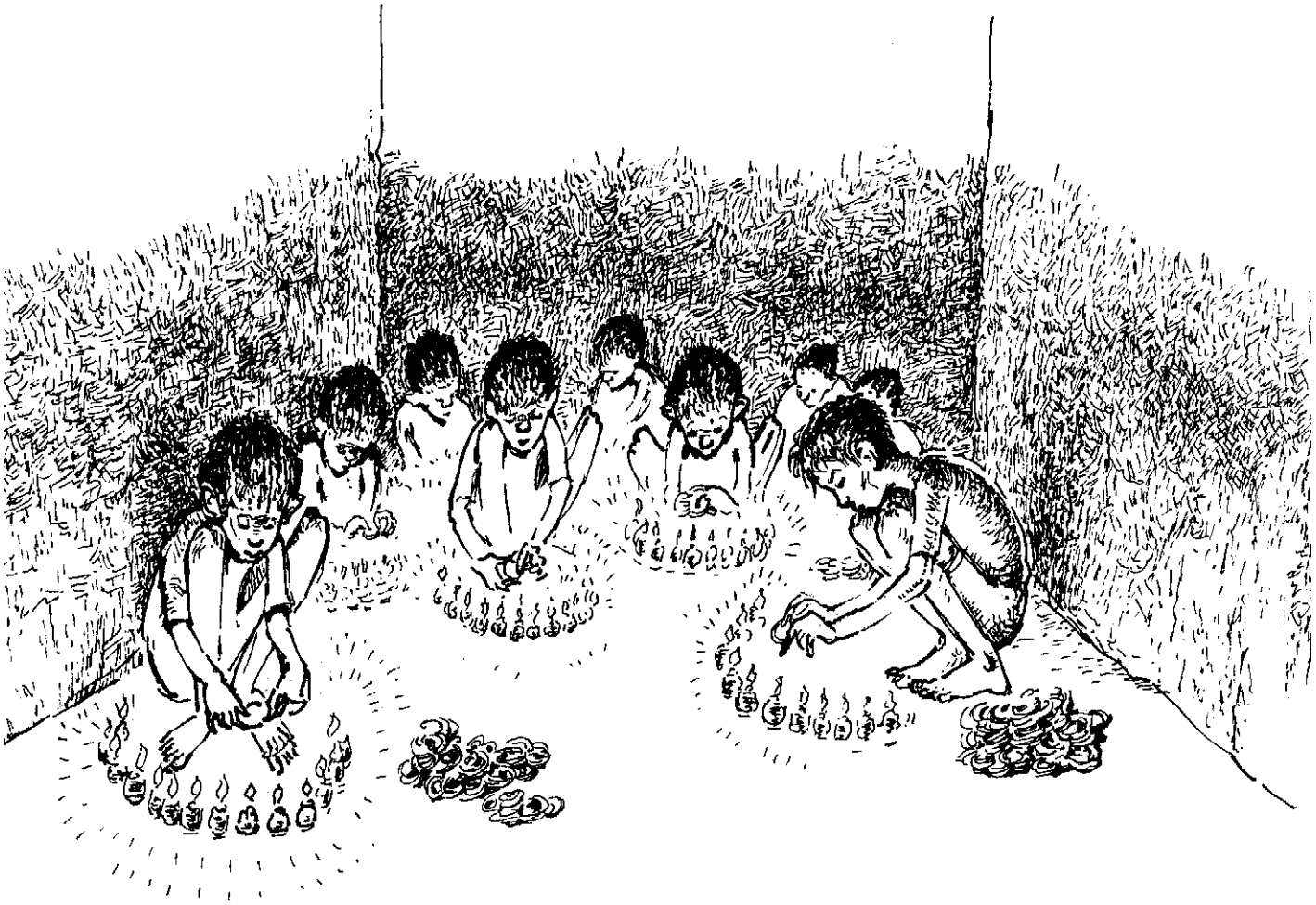
**Mix this with the ground mint.**

**Add three glasses of water to this thick pulp. Stir in the salt and sugar till they dissolve. Add ice to chill the drink, which can now be served to the hot and thirsty.**

## USING CINEMA

**Several commercial films both Indian and Western, have dealt with a fictional story set against one of the specific work situations, described in this manual. Here are just some of the films 'Kala Patthar' (Hindi) and 'Women in Love' (English) deal with the reality of life in a coal mining area. 'Norma Rae' (English) effectively portrays the varied dimensions of working in a textile factory. One of Shyam Benegal's films brings forward the plight of chikan embroidary workers. Other films that deal with OHH in nuclear factories include 'Silkwood' and 'The China Syndrome' (both in English). You could borrow one of these films from your local video-library and see it together. Follow it up with a discussion on the OHH included.**

**Of course many documentary films also have been made on these subjects but are more difficult to procure. Here are some titles: 'Whose Children? by Meera Dewan on the children working in Firozabad, 'The Children of Sivakasi, by P.V.Satheesh, and 'A Lost Childhood' by Feisal Alkazi, on street and working children in Delhi.**



In Firozabad it is a familiar sight to see people on bicycles, wheeling handcarts or cycle rickshaws which are piled high with brightly coloured bangles in different colours and hues. They are either being taken to peoples homes for completion or back to the factory for refiring.

Within homes also known as `judai addas', the bangles go through the stages of `jhalai', `judai' and `katai'. The bangles come in large bunches of 312 bangles, of which 12 bangles are reserved for breakage.

The first stage is 'jhalai.' This work is done by the women and children in the family. Four to five members sit in their one room house, which serves as their living, sleeping and working area. The roof and the walls of this room are absolutely black with thick soot. The soot comes from the kerosene lamps that are used in their work.

In front of each person are 10-12 small kerosene oil wick lamps placed in a semi-circle.

Each bangle is then held by both ends and the middle is heated over the flame. The heated bangle is then placed on the ground and gently pressed to align the two ends. Care has to be taken to ensure that there are no burns either from the flame or the heated bangle.

As the flame has to be absolutely steady, it is impossible to be either in a well ventilated room or to even put on a fan. It is also not possible to have an exhaust which would draw out the fumes.

As a result of either being too poor or the fact that their village has no electricity, there is not even a bulb in the room.

So sitting in a pitch dark room peering at the bangles puts a strain on the eyes of the workers.

These aligned bangles are now taken over by the men or older boys for the next stage which is that of joining the bangle or `judai'.

In this process the two ends of the bangles are heated over a kerosene and acytlene flame. The ends are pressed together and the flame melts the glass enough to join the bangle and make it a complete circle.

This process is also undertaken in a closed and suffocating room, so that there is not a slightest flicker of the flame.

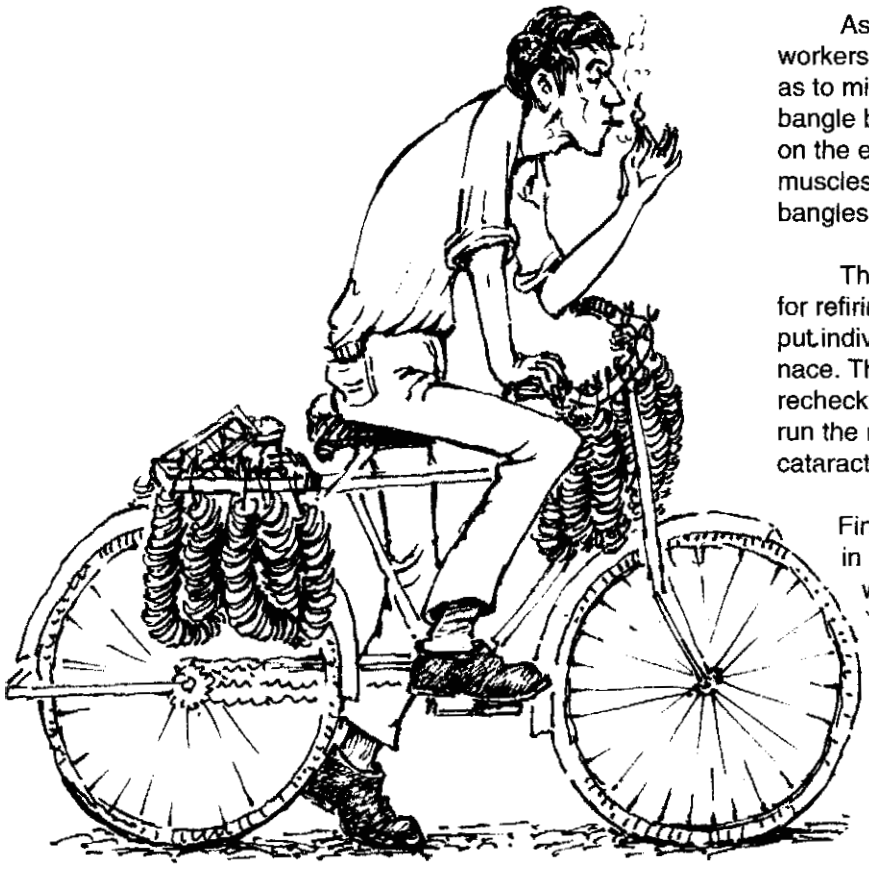
In both the stages of `jhalai' and `judai' the workers suffer from the risk of being burnt as well as putting a tremendous strain on their eyes. Cramps, pain in the joints as well as severe backache are some of the other hazards faced by these workers.

But it is the constant inhalation of the poisonous hydro-carbon fumes that is the cause of the high incidence of T.B. in this area. At any given time, if a worker were to clean his nose, the mucus would be full of the black soot.

Even a visitor for a few hours would find his/her nose full of sooty mucus.

The joined bangles are now ready for the `katai addas'.The carving is done on a fast revolving wheel on which designs are etched into the glass. These are later filled with gold and other chemicals. During this process it is very common for the worker to get cut on the wheel or get flying glass particles into his eye. This is accompanied by aches and pains including a strain on the back.

Gold coating is the next step that the bangles go through. Here a solution of pure gold and or chemicals is poured into the designs etched on the bangles, giving them an elaborate look. During this stage the workers handle all the raw chemicals without wearing any protective equipment, like gloves or aprons.



As the gold solution is very expensive, the workers have to be very careful in handling it, so as to minimize wastage. The designs on the bangle being extremely minute, it causes a strain on the eyes not to mention the back and other muscles as the workers have to crouch over the bangles for more than 8 hours a day.

The bangles are now sent back to the factory for refiring, which gives them a sheen. These are put individually on a tin tray and placed in a furnace. They have to be pulled out to check and recheck if the process is complete. The workers run the risk of excessive heat, burns and heat cataract.

Finally the bangles are sorted out and packed in boxes. Each box contains 24 bangles, which in the language of the locals is `one dozen bangles'.

The broken and defective ones are then put into the furnace for remelting, and once again begins the whole process.

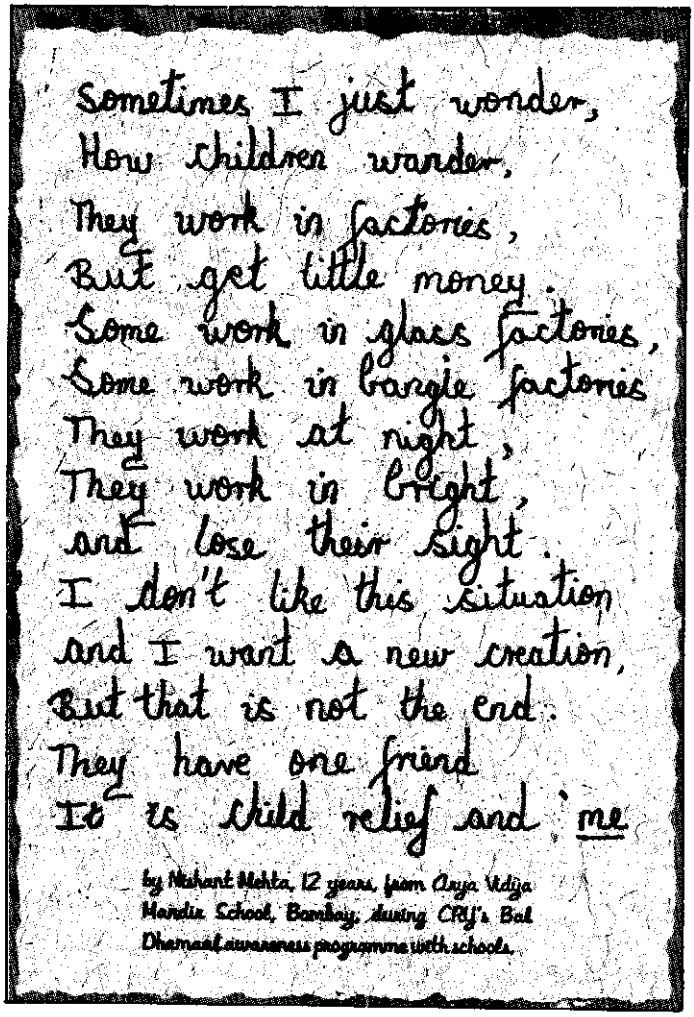
## GIVE THE COOK SOME RELIEF

Just like every office and factory has one room or space that is the hottest, so do all our homes- and that room is the kitchen.

In the summer months it is a torture to be in the kitchen cooking meals for the entire family. And most often it is our mothers who do so.

Think of simple ways to ensure that your mother or the cook keep cool in the kitchen during these months. It could even mean a simple thing like having them cut the vegetables in a cooler room rather than stand in the kitchen to do so.

Think of two wholesome meals which can be prepared by using the gas for a minimum period of time (not more than 20 minutes per meal). This would help the person cooking to stay away from the heat and still feed the family.


Sometimes I just wonder,
How children wander,
They work in factories,
But get little money.
Some work in glass factories,
Some work in bangle factories
They work at night,
They work in bright,
and lose their sight.
I don't like this situation
and I want a new creation,
But that is not the end.
They have one friend
It is child relief and me

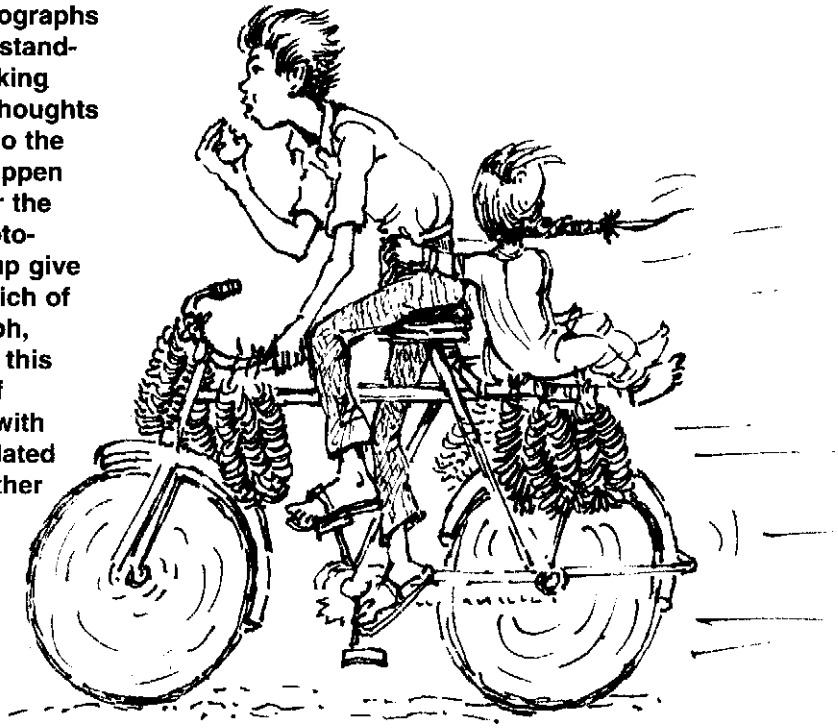
by Nishant Mehta, 12 years, from Anjo Vidya Mandir School, Bombay, during CRY's Bal Dharmat awareness programme with schools.

## GLASS COLLAGE

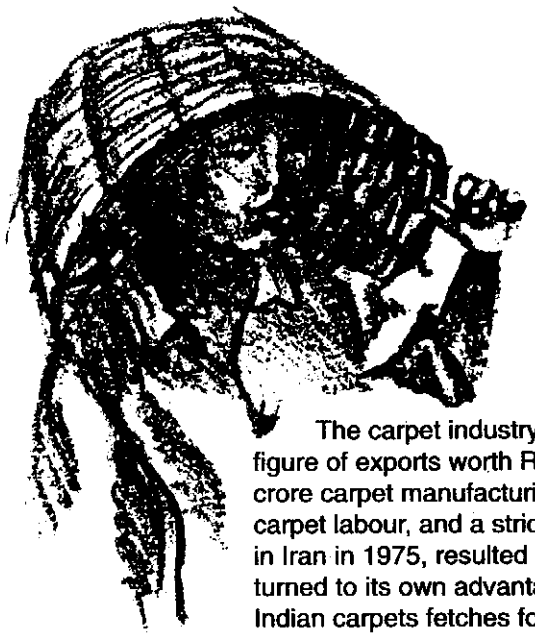
Use broken bangles, bits of mirror, flat glass beads, decorative glass pieces to create a collage, depicting some aspect/image of the glass industry that has struck you most after reading this chapter. You may use a sketch pen to illustrate and complete the picture.

## ANALYSING A PHOTOGRAPH

You can make a collection of photographs from magazines to gain a deeper understanding about child labour. Look at the working child depicted and try to enter his/her thoughts and feelings. What do you think led upto the events in the photograph? What will happen subsequently? What was the reason for the photographer taking this particular photograph? Let each individual in your group give the photograph a title of their own. Which of these titles best describe the photograph, which title forces you think more about this topic? Can you arrange an exhibition of these photographs-properly mounted, with interesting titles and with a series of related questions to bring the issue home to other students of your school.



# CHILD LABOUR I: CARPET INDUSTRY



Did you know that one out of every three urban households in India employs a child below the age of 14, to help with their daily chores. The jobs undertaken may range from sweeping or washing utensils, from getting the milk to collecting clothes to be ironed.... but each one of us regularly engages child labour.

The carpet industry in our country dates back to the Moghul period, and had reached a figure of exports worth Rs. 60 crore by 1951-52. But this was nothing compared to the 400 crore carpet manufacturing industry that existed in Iran. A tremendous increase in wages to carpet labour, and a strictly enforced ban on the employment of children below 18 and women in Iran in 1975, resulted in a crisis in their carpet industry. A crisis that our own industry swiftly turned to its own advantage, cornering a vast portion of the export market. Today the export of Indian carpets fetches foreign exchange to the tune of 200 crores.

India is the biggest employer of children in the carpet manufacturing trade. While the government claims there are 2,50,000 children employed here, UNICEF puts the figure at 7,00,000. The Mirzapur - Bhadohi belt not far from Varanasi produces 80% of the carpets exported by our country. It is here that we find the greatest concentration of working children.

*"Bending through the low doorway, as we entered the tiny mud and thatch hut, the boy looked up and grinned at us from behind the curtain of threads. The single dingy room is barely large enough for a human being to live in and he shares it with two other boys. With little light and no ventilation it was hot and airless on a summer afternoon. Here, this twelve-year old boy puts in a 12-hour day at the carpet loom.*

*The loom stands upright over a pit dug in the floor, and over it a plank of wood is placed on which he sits precariously balanced with his feet hanging into the dank, unhealthy pit. In the gloomy room the still air is permeated with wool fluff that makes us cough.*

*The children often get lung disease, their feet swell from hanging in the pit all day, working in bad light affects their eyesight and years of knotting carpets makes the joints of their fingers turn stiff and arthritic."*

*Subhadra Sengupta*

*This symbol of a smiling carpet is put as a label on those carpets that have been made without child labour.*

# Fear stalks rescued kids

**By DEBASHISH MUNSHI**
**The Times of India News Service**

NEW DELHI, January 11.

LIKE a frightened deer running away from a carnivore on its tail, 14-year-old Ramesh Kumar is always on the move. The traumatised tribal boy from Bihar is scared to spend two successive nights in the same place for fear of being hunted down by the hirelings of a carpet manufacturer from whose clutches he has recently been freed.

"Of what use is freedom from bondage if the authorities cannot give me protection from my tormentors ?" that is the question a tearful Ramesh asks. The question is echoed by Santoshi, Lal Man and Bansidhar, three other boys from Jorukhand village in Bihar's Garwa district, who face the same fate.

**OFFICIAL APATHY:** The efforts of child care activists to rescue battered children from industrial and commercial units have been going in vain because of the apathy of the administration in penalising the unscrupulous businessmen who keep bonded labour.

"There have been times when even a sub-divisional magistrate has been witness to the raids conducted on erring units, yet no action is ever taken. This emboldens employers to hunt down rescued children and trap them into bondage once again," says an activist of the South Asian Coalition on Child Servitude (SAACS).

**NO PUNITIVE ACTION:** In the seven years since the passing of the Child Labour Regulation Act, 1986, not a single employer has been arrested for illegally hiring underage children. Very little punitive action appears to have been taken under the Bonded Labour Abolition Act either.

The government's lack of will to act has wounded the souls of children. The petrified children have nowhere to go. Even well-meaning non-governmental organisations (NGOs) are helpless for they do not have penal powers.

**THE BIG QUESTION:** Ramesh, Santoshi, Lal Man and Bansidhar, who are now under the care of SAACS, long for their parents. "But how do we go back home with pistol-wielding goondas waiting to catch us ?"

Ramesh could barely walk straight when he was kidnapped by the hirelings of a carpet manufacturer in U.P's Allahabad district in 1984 and kept as a bonded labourer for nine long years. Ironically, he was kidnapped right from the heart of the Capital where his father was brought by the Centre to perform the Karma tribal dance during a Republic Day parade. The Ghasiya tribals of Bihar are famous for the Karma dance.

**HAUNTED BY FEAR:** "My father's joy knew no bounds when I was freed by child care activists in May last year. But barely a week after my freedom, I was waylaid by some goondas and forcibly taken to another carpet-making unit. Only recently, I managed to give my employer the slip. But I have no peace. They are after me," says Ramesh.

Bansidhar has been living in the jungle to escape the vengeful eyes of his former employer based in Varanasi district. "My parents have moved to the jungle, too, for they do not want to lose me again," he says.

## CHILD LABOUR: A PORTRAIT IN DRAMA

**The article given alongside (Fear stalks rescued kids) dramatically recounts how children come into the carpet labour industry, and what happens to them later. Elsewhere on this page you will find an excerpt from a play that deals with their work situation, and how they are hidden away when the police and reporters arrive.**

**Using both of these as a base- and from your own reading, research and fertile imagination, write and produce a short dramatic piece that you can present to your schoolmates - as a `special assembly' presentation or house function.**

# जादू का कालीन

**(धीरे–धीरे प्रकाश आता है । बच्चे अपनी–अपनी जगह, उठकर बैठते हैं । आँखें मलते हैं और लूम के पीछे जाकर, पहले की तरह उसके धागों के बीच से धागा निकालकर गाँठें बाँधना शुरू कर देते हैं। सुपरवाइजर–दो भीतर आकर बच्चों के बीच घूम रहा है । प्रकाश बढ़ता है । सुपरवाइजर–एक भागंकर भीतर आता है ।)**

*सुपरवाइजर–एक* : (**आते–आते**) होसियार। तैयार। आ गए...

*सुपरवाइजर–दो* : पत्रकार?

*सुपरवाइजर–एक* : (**घुड़ककर**) काम रोको !

**(बच्चे, एक साथ मशीन की तरह, काम रोक देते**
**हैं।)**

*सुपरवाइजर–एक* : उठो।(**बच्चे खड़े हो जाते हैं।**) पीछे चलो।(**बच्चे पीछे चलते हैं। मंच का एक चक्कर लगाकर सुपरवाइजर–एक पीछे चबूचरे पर पहुँचता है। बच्चे भी।**) बैठ जाओ। मुँह पर उँगली रखो। **(बच्चे बैठकर मुँह पर उँगली रखते हैं। लाखन नहीं रखता।)** बैठे रहो। मुँह से आवाज नहीं। समझे! (**झपटकर लाखन के पास पहुँचता है**) उँगली रख मुँह पर।

*लाखन* : क्यों?

*सुपरवाइजर–एक* : हरामजादा। पूछता है, क्यों। तोड़ दूँ हरामजादे का ... क्यों?

*सुपरवाइजर–दो* : छोड़। तेरा गुस्सा बहुत खराब है। मालिक ने कहा है, झंझंट नहीं। सुनो सब ध्यान से। पुलिस आ रही है। पकड़कर ले जाएगी सबको।

*सुपरवाइजर–एक* : अब पूछ क्यों?

*लाखन* : क्यों?

*सुपरवाइजर–दो* : क्योंकि तुम स्कूल नहीं जाते।

*लाखन* : इसकूल है कहाँ, जो जावें?

*सुपरवाइजर–दो* : उससे क्या? कानून है, स्कूल जाना होगा। जो नहीं जाएगा उसके माई–बापू को जेल।

*सुपरवाइजर–एक* : पुलिस पकड़कर पीटना शुरू करेगी, सब 'क्यों' भूल जाएगा।

*सुपरवाइजर–एक* : पकड़कर पेड़ से लटकाएँगे तेरी माई को। नीचे जलाएँगे आग। उसमें देंगे मिर्च की बुकनी।

**(लाखन के सिवा, सब बच्चे जोर–शोर से सुबकने–रोने लगते हैं।)**

*सुपरवाइजर–दो* : कर दिया कबाड़ा। मुझे यह सब पसंद नहीं हं। (**चिल्लाकर**) चुप!(**बच्चे सहमकर चुप हो जाते हैं।**) (**प्यार से**) मुँह पर उँगली रखो। (**सब रखते हैं। लाखन नहीं रखता है।**) बैठे रहो। जब पुलिस चली जाएगी, हम दरबाजा खोल देंगे। कोई नहीं मारेगा तुम्हें। पुलिस को तुम मिलोगे नहीं तो मारेगी कैसे! पर आवाज नहीं करना। चूँ भी की तो... ले जाएगी पकड़कर।

**(दरवाजा बंद करके, ताला लगाते हैं। सीढ़ियाँ उतरकर काम की जगह बैठकर हथकरघा चलाने लगते हैं।)**

*लाखन* : सब झूठ है। पुलिस नई, समाज–सेवक आवेंगे। पिछली खड्डी पे बी आए थे। क्या घुरघू की नाई बैठे हो। गाँव नई जाना, केसो। उल्लू की तरह बैठा काहे है। वे लोग तुझे छुड़वाकर गाँव भिजवा सके है।

*केशो* : **(फुसफुसाकर)** सच्ची?

*लाखन* : सच्ची। गाँव जाके करेगा क्या? माई–बापू फिर पठा देवेंगे काम पे।

*केशो* : मेरी माई ना भेजे थी मुझे।

*संतो* : **(उँगली हटाकर)** मेरी बी।

*लाखन* : और बापू?

*लक्खी* : वो क्या जाने यहाँ का हाल।

*कम्मो* : उसे पता चले तो कब्बी ना भेजे।

*संतो* : हम जाकर बतलावेंगे।

*बरखू* : बापू... मुझे... नई... ना... भेजेगा। **(सुबकने लगता है।)**

*लाखन* : रोना है तो चीखकर रो। नई तो चुप रह। तुम घुग्घुओं के बस का कुछ ना है। ले, वो आ गए। **(सब बच्चे नीचे झाँकते हैं जैसे खिड़की में से झाँक रहे हों। दर्शकों के बीच से मालिक दो औरतों और एक आदमी को लेकर नीचे मंच पर आता हैं।)**

*मालिक* : हें, हें... तसल्ली हो गई आपकी। हमारे यहाँ चौदह बरस से कम का कोई बुनकर नहीं है।

*लेबर आफिसर* : मैंने आपसे पहले ही कहा था। मैं इंस्पेक्शन कर चुका हूँ। यहाँ काम करनेवाले, सरकारी ट्रेनिंग स्कूल के ट्रेनी हैं या ये पुश्तैनी कारीगर।

*समाज–सेविका* : कुछ जमा नहीं।

*पत्रकार* : हैंड निटेड कारपेट्स के लिए बच्चे जरूरी हैं। निम्बल फिंगर्स, यू नो। एक्सपोर्ट आर्डर भी इसी आदमी के नाम है।

*समाज–सेविका* : एक चक्कर और लगाएँ?

*मालिक* : चलिए, लंच कर लीजिए। थक गई होंगी। आपके लिए रबड़ी मँगवाई है। स्पेसल। आइए।

*पत्रकार* : अभी भूख नहीं है। चाय इतनी हैवी करवा दी आपने।

*समाज–सेविका* : **(सहसा)** हम आपका स्टोर देखना चाहते हैं।

*मालिक* : स्टोर? क्यों?

*लेबर आफिसर* : कालीन खरीदना है?

*मालिक* : कालीन होते तो नजर करता। पर यहाँ आर्डर मिलने पर माल बनता है और बनते ही रवांना हो जाता है। हैंड टु माउथ बिजनेस है, साहेब।

*लेबर आफिसर* : चट मँगनी पट ब्याह।

*पत्रकार* : दिखलाने में एतराज है?

*मालिक* : लो। मुझे क्या एतराज होगा।

**(सुपरवाइजर–एक और दो उठकर खड़े हो जाते हैं।)**

*मालिक* : क्या? खाने की छुट्टी? देखे नखरे इनके। जाओ। रास्ते में स्टोर खोलते जाना। साहेब लोग देखना चाहते हैं। **(सुपरवाइजर–एक और दो जल्दी से ऊपर पहुँचते हैं।)** चलिए हुजूर। नाक पर रूमाल रख लीजिए। ऊन का स्टाक पड़ा है। सहरियों को उसकी धूर–मिट्टी ही बर्दाश्त नहीं होती। **(हँसकर)** साँस फूल जाती है।

**(इतने में लाखन चिल्ला पड़ता है।)**

*लाखन* : बचाओ। बचाओ!

**(समाज–सेविका और पत्रकार चलते–चलते ठिठक जाते हैं। सुपरवाइजर बच्चों की पकड़–धकड़ करते हैं पर बच्चे छूटकर चिल्लाते रहते हैं।)**

*केशो* : बचाओ! बचाओ!

*लाखन* : ऊपर!

*केशो* : स्टोर के ऊपर!

*सब बच्चे* : बचाओ! बचाओ! स्टोर के ऊपर! ऊपर!

*लाखन* : मार डाला रे! बचाओ! बचाओ!

**(समाज–सेविका और पत्रकार भागती हुई ऊपर पहुँच जाती हैं और दरवाजा पीटने लगती हैं। अंदर से बच्चे दरवाजे पर धक्का मारते हैं। नीचे मालिक और लेबर आफिसर रह जाते हैं। मालिक अर्थपूर्ण निगाहों से लेबर आफिसर को देखता है। इशारे से पूछता है, अब?)**

*लेबर आफिसर* : सॉरी। मेरे हाथ में नहीं है।

*मालिक* : फिर कमीसन किस बात का लेते रहे?

*लेबर आफिसर* : कमीशन? कैसा कमीशन? दरवाजा खोलिए जाकर! जानते हैं आपने कितना संगीन जुर्म किया है! आजकल बाल–मजदूरों को लेकर दिल्ली में हंगामा मचा हुआ है।

*– मृदुला गर्ग*

Work on looms is scattered over a network of 15,000 villages. As the weavers work on a commission basis, it is easy to avoid all legal liabilities by stating that none of them are employees.` It is even easier to bribe the labour inspector to `persuade' him that the children on the premises are trainees or family members.

The majority of children working here are from the nearby tribal areas of Bihar, children of landless labourers. Living far away from home, they can be forced to work for upto 12 hours a day at a meager salary of Rs.10. From this sum the loom owner deducts the expense of food, medicines and clothes. On an average, a square yard of carpet is woven by each boy in a day. The price of this is 100-400 rupees in the export market.

Physical abuse and branding keeps the children terrorized, long hours of work and poor food makes them too weak to even think of escape.

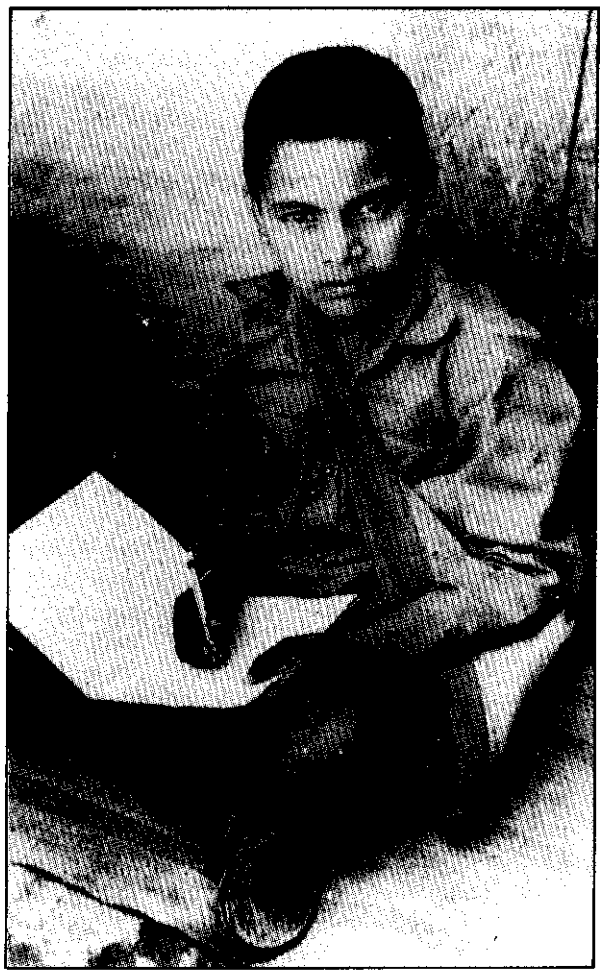
A recent study of occupational health hazards was carried out by CREDA, a local voluntary organization in Mirzapur, working towards the liberation and education of children in this industry. The study investigated 25,000 workers in this area, along with a control group from the same economic background, and found that as regards eyesight and overall health, the carpet workers were at a disadvantage.

Simple devices such as inserting glass tiles in the roof to improve the lighting or providing spittoons so that the TB- infected spit that is often spat out into the pit is contained, will go a long way in improving the health of the workers.

## *CREDA : A RAY OF HOPE*

*But even in the midst of this depressing scenario, there are organizations working to improve the situation of children employed here. Shamshad Khan who started CREDA (Centre for Rural Education and Development Action) in 1982, has over the years got more than 5,000 children released from bondage. This organizâtion`s first task was to understand the occupational health hazards problems, as mentioned in the text of this chapter. They then went on to getting children actually released. This was done by putting pressure on loom owners, that neither the law nor the community was in their favour. They should therefore release the child and employ an adult instead.*

*The child released now either returns to his parents in a neighbouring state, or goes into a special school set up by CREDA. To ensure that the children remain in the educational system, the following strategies have been developed:*



*a. The establishment of special schools that provide the ex-bonded children with an opportunity to complete their five years of primary schooling in just three years.*

*b. Supplementary nutrition is also provided through these special schools.*

*c. A self-help credit scheme, is available for families of ex-bonded child labour, funded jointly by the parents and UNICEF.*

*d. A programme to train women in carpet weaving has been set up, so that they can work in their leisure time and supplement the family income.*

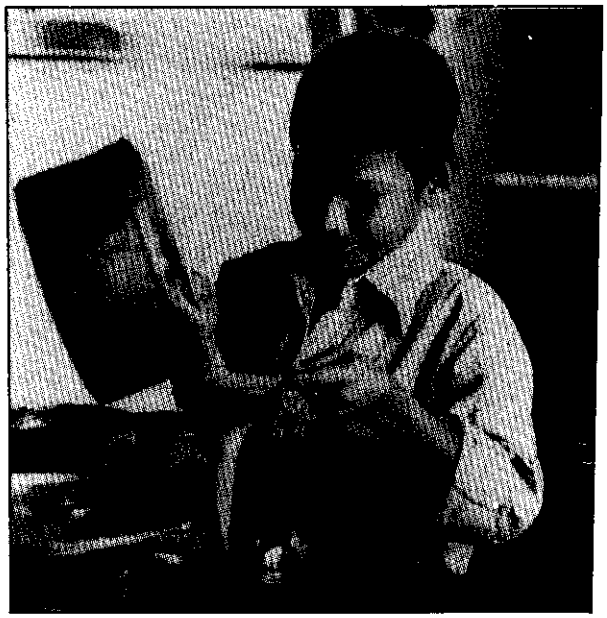
*e. A six month/one year long training programme for youth in carpet weaving has also been initiated.*

*The underlining principle of CREDA's work is that they are not trying to damage the carpet industry, but to stop the exploitation of children.*

## CHILD LABOUR SURVEY

**Carry out a detailed survey in your neighbourhood of the jobs that children your own age do. Look at:**

*** What built in risks are there ?**
*** How serious are any of these risks?**
*** Could the risks be removed at source?**
*** What training could be imparted to better deal with any of these risks?**



# Les miserable of the carpet world

The fight against the bondage of children in the rug trade began eight years ago when a woman social worker, Champa Devi Srivsatava, formed the Bandhua Mukta Samiti in Mirzapur.

She protested against the practice of making eight and 10 year old children work long hours at the loom for practically no money. Since bondage is against the law, she was able to get some boys rescued from the clutches of loom owners and returned to their indigent parents.

Sometime back the south Asian Coalition on Child Servitude (SACCS), a network of nearly 50 non-government organisations (NGOs) began a 15-days march through the carpet belt to campaign against child labour. Accompanying them were about 40 children freed from carpet bondage.

Several villagers approched the coalition for help to get children freed. Typical was Gulbaria from village Singhpur, who told rerporters: "I've lost my son and nephew. They were taken away two years back to weave carpet in a village near Varanasi. They haven't returned since then ."

The boys were taken by a middleman from her village, who gave the family Rs. 3,000 for them, promising that they would be taught weaving and paid decent wages. But Gulbaria has not seen them since or received any money. Attempts to get back the boys failed because the loom owner claimed he had paid Rs.7,000 for them and wanted the amount back for releasing them. Gulbaria had not dared to approach...

Says Kailash Satyarthi, president of SACCS, " Hundreds of children have been brought to Varanasi, Mirzapur and others parts of the carpet belt to work. The trade is spreading to other areas too. During a recent visit to Alwar in Rajasthan I found that 300 looms had been set up there employing several hundred children."

The practice reached such alarming levels in the past five years that Satyarthi decided to punch AICMA where it hurt most. Two years ago he launched a consumer awareness campaign in Germany and the US, highlighting the fact that Indian carpets are made "on the blood and bones of Indian children." Carpet sales slumped.

Since the carpet trade is highly competitive and countries like Iran, China and Taiwan are making rapid in roads, the campaign rattled Indian manufacturers.

They agreed to a dialogue with NGOs. They also set up a Child Labour Eradication Committee whose members visit villages to spread the message that employing children under 14 is a punishable offence. The message is combined with others on family planning, education for all and basic hygiene. AICMA is even recording these village interactions to use in a counter media campaign in the West.

AICMA has drawn up a code of conduct to be signed by its members, guaranteeing they will not use child labour. They plan to put a special stamp on their carpets certifying they are free of child labour.

Satyarthi is critical of the manufacturer-exporter lobby certifying its own carpets. "Such certification requires proper investigation and can only be provided by an independent body comprising exporters, importers, government official and NGOs," he says.

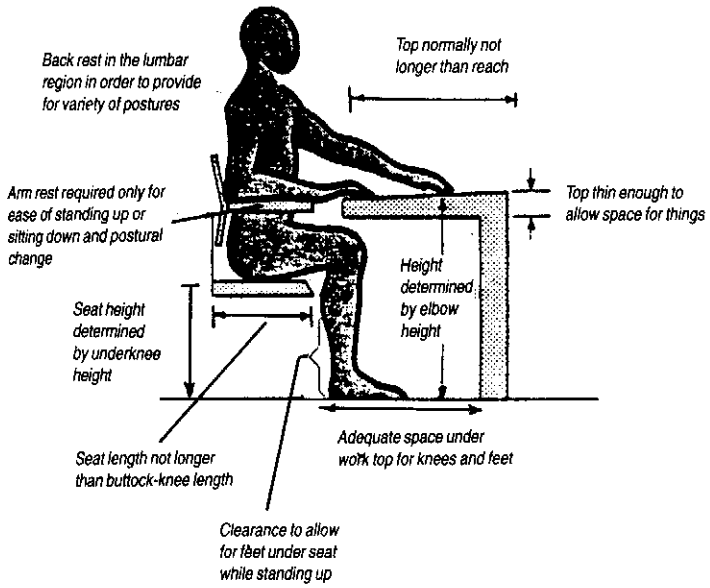
-Womens' Feature Service

## BE AN ERGONOMIST

**Keeping in mind the posture required to weave a carpet, could you design appropriate tools / work areas to alleviate some of the health problems that are linked with the carpet industry? If so you will be performing the function of an ergonomist.**

**Ergonomics is concerned with increasing the efficiency of a person by improving their work environment. Backrests, lighting, ventilation can all make a great degree of difference to the workers efficiency. Ergonomics further ensures that the environment should have no detrimental impact on the workers health, and that the possibility of accidents is minimised.**

**The illustration given alongside shows you how an office chair can be designed, keeping in mind the principles of ergonomics. Look at the drawing in detail, before planning how you can redesign the working environment of the child involved in carpet manufacture.**


Back rest in the lumbar region in order to provide for variety of postures
Top normally not longer than reach
Arm rest required only for ease of standing up or sitting down and postural change
Top thin enough to allow space for things
Height determined by elbow height
Seat height determined by underknee height
Adequate space under work top for knees and feet
Seat length not longer than buttock-knee length
Clearance to allow for feet under seat while standing up

*Seat surface slightly tilted backwards and not smooth to maintain equilibrium*

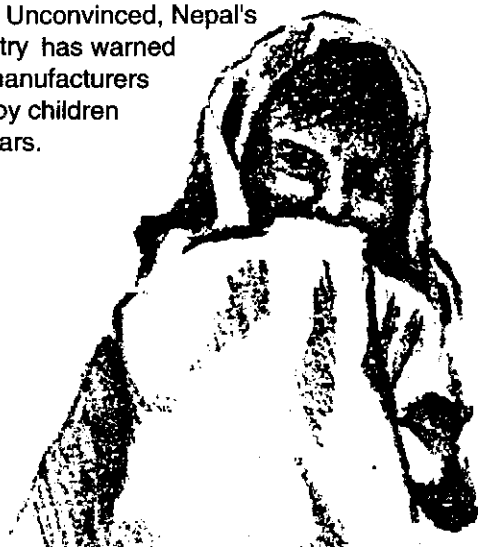
*Seat width determined by sitting buttock width*

The constant crouching over the loom, involvement of only fingers and hands in the task, the lack of support for the back, all result in repetitive strain injuries(RSI). Further because this is not a setup where all the weavers work together in a factory and therefore come under the regulations of the Factory Act, and also because workers are paid on a piece - rate, there are no regulations laid down as regards breaks from work, rates of work, amount of leave, working hours etc. Workers are continuously harassed to work faster and they do not complain about their RSI or other health problems, till they actually collapse.

## CHILD LABOUR ON THE MAT

German concern for child labour has hit carpet manufacturers in Nepal. A Panos report says that approximately 35% of their export orders have fallen through and 100,000 sq. metres of carpet meant for export lie dumped in stores as a fallout of an adverse German television programme.

On April 28th 1994, a fifteen minute documentary by the Panorma television channel in Germany claimed that children as young as five years were employed by the Nepali carpet industry. The allegations were dismissed as "absurd" by Kamal Singh Karki, a leading carpet exporter and president of Nepal's Central Carpet Manufacturers' Association. Unconvinced, Nepal's labour ministry has warned the carpet manufacturers not to employ children below 14 years.



*"The loom is past, present and future. In its mechanical click-clack are counted the days and weeks of those in its thrall. The loom represents heritage, hope, necessity. There is no escape from the loom. From father to son, the bondage is perpetuated.*

*Mirzapur, a canvas of children at work. Cheap or unpaid child-labour has been crucial to the flourishing carpet industry. On the loom the children weave the colours of their fleeting childhood. Child labour has been prohibited by the State, especially as carpets are made for export. But the work is done in homes, mocking at the law.*

*In the broad fields, children are everywhere: little girls working in the fields, threshing corn, stacking hay, fetching water, blowing embers, cleaning courtyards, holding babies. Little boys minding goats.*

*When will the canvas of Mirzapur change?"*

*Shailaja D.Sharma (The Review)*

# A bit of indulgence for child labourers

Shankar, 13, gathered up his clothes in a bundle and stole out of his house one night while his family was asleep. He was headed for the camp at Medupalli, about 20 km from here, where child labourers learn the three R's before being admitted to government schools.

"I was tired of working and wanted to study," he says. And since his mother had refused to let him go to the non-formal education centre (NFE) in his slum colony, he figured she would not let him go to the camp either. His parents, both construction workers, could not afford to let him stop working as they were paying back the loan taken from a relative with the wages he earned for grazing cattle.

Shankar is a bit embarrassed about the scene his mother caused at the camp, after she traced him there. "She tore off my clothes, spanked me and took me home," he says. But Shankar was determined to go to school. The camp authorities were therefore not surprised to see the 13-year-old back a few days later. Shankar had run away again.

"The supervisor at the biscuit factory used to slap me," sobs Laksmi, seven. For the past year she was packing and sealing at the factory from 8 a.m. to 9.30 p.m. Complaining to her mother was no use. "If my mother had fought with the supervisor he would have thrown me out and we would have gone hungry," Laksmi added.

**LOVE NOTES:** Ramesh is a sunny nine-year-old. He has acquired quite a reputation among the girls. "He sends love notes to nine-year-old Kavita to show off of his just acquired writing skill," laughs Mr Lingiah, the camp's assistant co- ordinator. Baburao, seven, is so enchanted at being able to write, that he signs his name on bits of paper and passes them around.

Shiviah, eight, is a quiet child. For one year he worked at a tin factory where he used to fold metal sheets. He left home at 6 a.m. every morning and worked till 2 a.m. with one- hour breaks for breakfast, lunch and dinner. When he first arrived at the camp, he was the only child who could not get to sleep by 9 p.m.

Like most of the other children, he'd never had the chance to venture out into the open, because whether there was work or not, he was expected to sit at the factory, waiting for something to come up.

For Shankar, Laksmi, Ramesh and Kavita, as well as Balamma(12), Jayamma(12) and 174 others (most of them from the 25 biscuit factories in Katedan on the outskirts of Hyderabad), this camp has returned their childhood.

## ROLE PLAY

The technique of a role play is very useful to understand the dynamics of a particular situation. By playing out the `role`of people in this industry you will understand their predicament even better.

1. Ask people to form two lines facing each other: a line of Persons A and a line of Persons B. The person opposite you in the line is your partner for the role play.

2. Set the scene. Give everyone a simple-2 role situation. Be specific if necessary: "Person A, you are...." "person B, you are..." If helpful, give participants 30 seconds to get into their roles and ask them to play them out.

3. Tell people that when you yell "freeze" they should remain motionless. After a brief period of time you can continue that situation, or evaluate.

4. In evaluation, first focus on body language: look at hands, eyes, power position, height. Then focus on what happened in the various pairs during the action: tactics, resolutions, etc.

Sample two-role situations:

- Everyone in line A is a loom owner, everyone in line B is a child carpet weaver.

- Everyone in line A is a policeman implementing the Child Labour Act. Everyone in line B is a loom owner.

- Everyone in line A is trying to kidnap the person in line B.

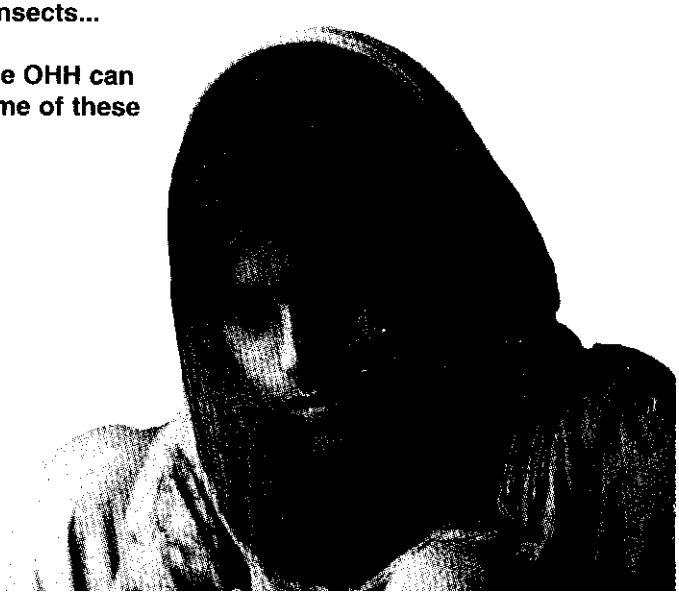
- Person A is severely beating a child about the head. Person B is a passer-by.

Get the group members to come up with their own ideas on the theme.

## OHH AT HOME

Look around your own house, and the tasks your servants do everyday, and you will find many examples of occupational health hazards. Think of the woman who comes to sweep and swab the floors daily. She faces the risk of getting a skin infection or dermatitis from handling detergents, bleaches and other cleaning agents, or from chrome and nickel dissolving into washing water from stainless steel buckets or sinks. Bleaches and disinfectants can also react together to produce clouds of chlorine and other gases. These can be highly irritating to skin, eyes and the respiratory tract. The constant inhalation of dust while sweeping can cause respiratory problems, leave alone the posture used which can result in back and knee injuries. The cleaning of garbage by her also puts her into contact with excrement, vermin, insects...

Think of simple ways and means that these OHH can be reduced or minimized. Try implementing some of these in your home.



CHILD LABOUR II:

# MATCHSTICK AND FIREWORK INDUSTRY

*Can you imagine half a lakh of children getting up everyday while it is still dark, not to go to school, but to congested, dingy sheds which serve as factories? In these factories they work from 6 a.m. to 7 p.m.crouched on the ground, backs bent - handling dangerous chemicals.For this work each child earns only between rupees two and rupees seven per day!*

*This is Sivakasi, the home of the handmade matches industry that employs more than 50,000 children. The largest single concentration of child labour in the world. The age of these children range from three and a half to fifteen years, and they work for as long as twelve hours a day in degrading and hazardous working conditions.*

It was in the 1920's that the continuous drought and therefore poor agriculture of West Ramanathapuram District of Tamil Nadu, attracted local businessmen to set up match stick and firecracker production units. The dry weather was essential for their manufacture, and the limited agricultural opportunity ensured a steady supply of cheap labour. In fact the profits were so high that soon everything needed for firework and match stick manufacturing was produced locally:metal powders, chemicals, even paper.

Today children constitute almost 50% of the labour force in this industry, and among them girls outnumber boys in the ratio 3:1. Women constitute 30% of the labour force, and it is only for a very few of the arduous and hazardous jobs, that men are employed. The various processes involved in match stick manufacture allow for some of these to be carried out at home, and others in factories. In a home situation, entire families can be occupied in matchmaking on a part-time basis to supplement their earnings.

The growth of this industry has been so phenomenal that in the last few years, it has been experiencing an acute shortage of labour. To meet this demand factory owners have been using their own buses to collect children living in distant villages to work in their factories. They are picked up at 4 a.m. and sent back by 7 p.m.

"In the Standard Match Industries (a small scale unit) at Madathupatti we found 250 children, most below 10 years of age, working in a long hall filling in a slotted frame with sticks. Row upon row of children, some barely 5 years old were involved in their work. The incentive to keep filling the frames must have been so great, that most of them scarcely looked up and even when they did, their hands mechanically continued their activity. The children were paid 15 paisa for fitting each frame and they earned, depending on their day's output, between Rs.2/- and Rs.5/-.

In the chemical dipping section, though only older children were employed, other younger children helped in bringing the frames for dipping. The fingers of many children were coated with these chemicals. Copious vapours were apparent and a strong odour emanated from the room.

In the other sections where box-filling, hand-rolling (putting the striking surface bands) and labelling activities were going on, the workers were between the ages of 13 and 22 years. What was striking was that throughout the entire unit, there was a high percentages of girls employed. In the later sections, almost all the workers were females. When asked why they worked, most answered that they had to earn for their families. Most had never been to schools in their villages. One of the children interjected that there was no time even to rest.

The general working environment in most of these cottage industries was appalling. Cramped spaces, practically no ventilation and filthy floors were evident in about every unit we visited. Puddles of chemicals around the vats of chemicals were also evident in most units."

Smitu Kothari
"There's Blood on those Matchsticks"

I carry 6000 frames a day This makes me dizzy and faint because of the heat and the heaviness of the frames. If my reflexes are not sharp all the time I might set free to myself
– Shrini, 10 year old

I pack over 5000 packages a day. My wrists and back ache all the time. If I speak to another boy, the foreman hits me and cuts my wages for half a day. Sometimes the bundles catch fire and my fingers get burnt. And then it is difficult to work.
– Chinnadorai, 11 year old

I am sick of working in the factory. I don't sleep well at night, keep getting fever, throat congestion, cough and cold. I get cramps in my stomach and legs, my whole body aches every morning. They give me an aspirin at the factory every day.
– Devraj, 8 year old.

PLEASE ANY OTHER WORK BUT THIS. THIS FACTORY IS KILLING ME.

What are the activities these children are made to do?

Children are engaged in mixing steaming chemicals in the boiler room; stamping frames of match splinters in trays of wet phosphorus and drying them on hot sheets of metal in a huge furnace; filling frames with sticks; placing and storing the frames in racks; filling match boxes; labelling match-boxes; packing boxes into packages of dozens. Each stage of the process has its inherent hazards and nervous strain, since the children are only paid according to the amount they produce i.e. (piece-work). They are pressurized to maximize their output and the effect on their bodies and their nervous system is harrowing.

There are a large number of occupational health hazards linked with this industry. For example, children mixing chemicals in the boiler-room get their lungs full of toxic fumes, suffer high degrees of intense heat and run the risk of being badly injured in fire accidents. Children who stamp frames on the metal sheet too suffer heat, toxic fumes and excessive strain on the arms and shoulders as they have to remove and place the heavy frames with great rapidity. Delay of a second too long can cause the entire frame to go up in roaring flames which could cause instant death.

In the filling section children sit on their haunches bending forward for hours filling sticks into boxes, with neurotic frenzy. Here, fire accidents can occur when match-heads rub against the friction side in the course of putting the box together too quickly. These children also suffer from severe back and neck-aches.

Once in a while some cases are brought against the factory owners for employing children below the age of 14. Their punishment if the allegation is proved is a paltry fine of Rs.25 - 50. Even a second or subsequent offence does not result in a heavier fine. Further, the Labour Department of the State Government does not have the power to suspend the license of a factory that is violating the laws by employing children.

In fact this industry is so profitable that in the last few years many government employees, teachers and even the labour inspectors have set up their own units.

## BURNT ART

**Match sticks : We use these products, made by the children of Sivakasi, everyday in our own kitchens. And what do we do with the burnt match sticks?**

*** Place a bowl near your gas range in the kitchen where all the used match sticks can be placed.**

*** Collect a large number before attempting the following art activity.**

*** Use a dark coloured handmade paper as a background for a painting/collage about Sivakasi, using only used match sticks.**

*** Place the match sticks end to end to create lines, break them up into small pieces to create a different texture, or even colour them if you wish.**

*** Glue the match sticks in place once you have `organized' your composition.**

## *I WANT TO HOLD YOUR HAND*

*I do not know who you are*
*You sit near my building, begging*
*You cannot be older than me*
*A child forced to humiliate himself*
*To spread his hands in front of strangers,*
*To endure kicks, insults and abuses.*
*Sometimes there is a look in your eye,*
*of hatred. Who do you hate? my world?*
*or the parents who deserted you? or me*
*the boy in good clothes and a chocolate in*
*my bag? or do you hate yourself?*
*I wish I were your friend, I wish,*
*I could make that look in your eye vanish,*
*I wish I could span the gulf between us*
*I wish I could hold your hand*

*Kunal W.Shah, Greenlawns High School*

## BAR CHARTS

**Analysing statistics is an important way of understanding information. The figures, ratios and percentages given in the box entitled Capital Survey on the next page, are a good example.**

**Given below are techniques to translate statistics such as these, and others you may collect, into visual material. The advantage of presenting these visually/graphically is that they can be comprehended at a glance.**

**The bar chart is one of the most frequently used forms of graphic charting. Bar charts are categorized as one-scale charts. You are limited in your design only by the fact that they are measured by a quantitative scale, which extends along either the horizontal or vertical length of the bars, depending on which format you use, horizontal or vertical.**

**The vertical dimension (or horizontal dimension if you are working with a vertical format) has no scale, but can provide space for labeling.**

**There are literally dozens of bar chart variations possible, ranging from the simplest solid bars to more involved methods of emphasizing certain bars or portions of your chart.**

**A simple bar chart can be used to chart the progress of several different items, one against another.**

**An emphasizing bar chart can show the growth of a particular product or item against its competitors, with the highlighted bar representing your product while the other bars represent competitors.**

**A progressive bar chart can effectively be used to compare different items phasing in and out at different times.**

**A group bar chart enables you to compare two different actions of two different groups, against the same scale.**

**A subdivided bar chart can be used to show the growth of items, e.g., the black part of the bar could show past action, the lined part of the bar could show present action, and the open bar could represent future action.**

**How about translating some of the statistics given on the next two pages into bar charts?**

## *CAPITAL SURVEY*

*A recent study carried out in Delhi indicated about 50,000 children work in tea-shops or dhabas and restaurants, 30,000 at car or scooter repair workshops, 50,000 in shops and other establishment, 40,000 at farms, construction sites and brick-kilns, While 1,30,000 work as domestic servants, more than 2,00,000 are street children, beggars, child prostitutes, vendors, tailors and helpers.*

*The occupational hazards associated with child labour were also detailed by the study. The shoeshine boys are prone to asthma, bronchitis and tuberculosis. Zari(embroidery) workers get eye diseases; ragpickers get scabies, tetanus and asthma; the chottus of the hotels get skin diseases, diarrhoea, malaria or typhoid; scooter mechanic boys are prone to fatal accidents; the brick-kiln workers get silicosis, diarrhoea and those employed at the handloom industry fall victim to asthma or tuberculosis.*

*About 86 per cent of child labourers are male and 14 per cent are female children. Among the male children 63 per cent are illiterate, about 5 per cent studied upto primary level and just 3 per cent go up to the secondary level and about 17 per cent are literate without a schooling. Among the female children, 81 per cent are illiterate.*

# CHILD LABOUR III: LOCK INDUSTRY

80% of the locks we use are made in Aligarh district, and locks or parts of locks are made in almost every home in the old city.

Polishing the rusted parts of the lock on buffing machines is perhaps the most hazardous part of lock making. More than 60% of the workers here are less then 14 years old. They look like coal miners, covered from head to toe in the black powder that comes from being bent over the machine, their faces a mere 10 inches away from the rotating machines.

Electroplating involves tying polished metal pieces on copper wires and submerging them in acid and alkaline baths. The chemicals used here - potassium cyanide, triosodium phosphate, sodium silicate, hydrochloric acid, sulphuric acid etc., are very dangerous and many of these give off noxious fumes. The hands of the children who work here, (and 70% of the workers here are children), remain in these solutions for the better part of the 12 hour day. Also, as an electric current is passed through these chemical tanks and children often get shocks. In none of the units are gloves used, nor are exhaust fans installed.

50% of those working in spray-painting the locks are children. Exposed to large quantities of paints and paint thinners daily, their lungs are the first part of the body to be affected.

On an average a child employed in the lock making industry earns Rs.50 a month, after a year long apprenticeship when he earns nothing. This works out to an average of Rs.1.60 per day, for a 12 hour day! Any day he does not come, his wages are deducted. After three-four years, salaries may go up to 125-140 per month, i.e. Rs.4 for a 12 hour day. Much of the work is carried out at night, due to the regular power-cuts during the day.

## *A LOST CHILDHOOD*

*Eleven-year-old Munir was fast asleep on a heap of polythene bags on a pavement in front of the ramparts of the Red Fort. Two years ago he fled from his home in Bangladesh, and begged his way to Calcutta and then all the way to Delhi. Now he collects rags, paper and polythene bags from rubbish bins, sells them for a paltry sum to feed himself. More than two years ago he left his father, mother, a sister and three brothers.He has not heard of them since. His parents had both remarried and Munir, barely nine-year-old then felt unwanted. He spent a few months in Calcutta and then on the advice of "friends" in the street and slums there boarded a train to Delhi.*

*Very shy and surprised that anyone wanted to know how he lives, what he eats, and what he earns, Munir says he wakes up at 6 a.m. and goes out to collect bits of waste paper, used polythene bags, and if luck favours, pieces of scrap metal. He sells the polythene bags for one rupee a kilogram and waste metal for ten rupees a kilo. For two hours he searches the dustbins and the street for waste material carrying it back to his "home" on the pavement and then to a dealer who buys the scrap.*

*After two or three hours, it is time for him to rest, with a cup of tea at a pavement "chaiwala" and occasional slices of bread. Afternoons are mostly spent sleeping or even seeing a film. Then in the evenings he collects waste material again. " I am able to earn on an average Rs.15 a day. On some days I am lucky enough to find pieces of brass, old taps, door knobs, and I make as much as Rs. 25. I spend Rs.2 to Rs.4 on each meal, some money is left for tea, and occasionally I can treat myself to a film," says Munir. He eats at a nearby "dhaba" and lives on the pavement with others like him, many of whom are also from Bangladesh.*

*"He gambles sometimes," an older boy chips in , and little Munir denies it vehemently. "No, I do not smoke hashih, nor do I gamble, how can I? I barely make enough money for myself," he adds.*

*Does he miss his parents, his little brothers and sister? Why did he run away? For a moment, he is silent, and then lowers his eyes. "I did not run away, they did not want me. My parents abandoned me." At the age of nine he had for painfully learnt to fend for himself, and today Bangladesh and his family seem very far away. Doesn`t he want to go to school in his spare time? The thought has never occurred to him, he says.*

*Munir`s is a daily strugle. Each day he has to collect enough waste material to make money to be able to eat that day. Who has the time or the emotional energy to think about a future? For the past two years he has been sturggling to survive and forget the past, his family. He has had to learn to survive in a world of adults and grow up long before his time. Today is Children`s Day, but for Munir it is a day like any other. He will get up early in the morning to rummage through dustbins looking for plastic material, waste paper and bits and pieces of metal. On this day thousands of well-groomed children will hold rallies and remember "Chacha Nehru". But for Munir there is no Children`s Day for he never had a childhood.*

## REACHING OUT

**The three chapters on the Glass Industry, Carpet Manufacturing and the Matchstick and Firework Industry have given us some idea of the impoverished childhood that working children in our country face. Given the vast number of such children, it appears as though the reality of working children will remain with us for some more time. Of course there are constant efforts at improving their situation, bringing them out of bondage (see the article on CREDA in the carpet labour chapter, and the boxes given alongside. Also the article: A bit of indulgence for child labourers), but as the reason most of them work is poverty, a solution seems far away.**

**But what can we do?**

**Becoming aware of their situation as we are through reading some of the chapters of this book or from an occasional magazine article, is only the first step.**

**But here is an idea of how you can help in a practical way. It is based on an ongoing project being carried out by school children in the Bangalore and Coorg region.**

**Children as ragpickers are a common sight in all our cities, and it goes without saying that such an occupation has its own occupational health hazards. To reduce the amount of sifting through rubbish that they had to do in order to earn a living, school children organised an unique scheme.**

**On a daily basis, squads of school children collected all the `saleable rubbish` that accumulated on their school campus - paper, plastic bags, used ballpoint pens, packaging - and stored it away. Once a month this collection was distributed free to a group of ragpicking children for them to sell in turn. Not only did the health of the ragpickers improve, but the interaction between the two groups resulted in several additions:providing a hot meal, organising regular health checks, making old clothes available at 50 paisa each ..... the list is endless, the possibilities tremendous.**

**Maybe, you can start a similar activity in your own school?**

*"One dealer in gems has an album with coloured photographs of children working. He said that his foreign clients were very impressed that small children could be made to work and this fact was used to profit in his sales strategy. The myth of a traditional occupation coming down from father to son was also repeatedly used to effect."*

Neera Burra, Economic and Political Weekly

*On 15th August 1994 the Prime Minister committed the Goverment to removing 20 lakh children from child labour within 5 years.*

# GEM POLISHING IN JAIPUR

The gem industry of Jaipur is as old as the city itself i.e. from 1729 A.D., and today 95% of all the coloured gemstones in India are polished in Jaipur. The tremendous increase in the international demand for gems has brought child labour into this industry in large numbers. Parents also see this trade as one that allows for upward mobility as the child is trained in a skill. Today over 13,000 children are employed in this trade.

Two categories of working children exist here. The first are those who work full time from 8 a.m. to 6 p.m. They are between the ages of 6-10 and are children of manual labourers, and are completely illiterate.

As children are taken into this trade ostensibly as apprentices, for the first one and a half years, they are paid nothing at all. Then they are taught how to grind one facet of the stone - till after a two year period, they start getting paid Rs.50 per month. By the time the child is 14-15, he has learnt most of the finer polishing work and earns Rs.150-200 a month, compared to an adult who would earn Rs 500-600 for doing the same job.

The second group are mainly in the age-group 10-14, and work for four hours a day after school. Their parents have steady incomes-either in the gem polishing trade itself, or as tailors, barbers, government servants etc. These children working four hours a day, six days a week get no regular wages, but just the occasional 15 rupees on festival days.

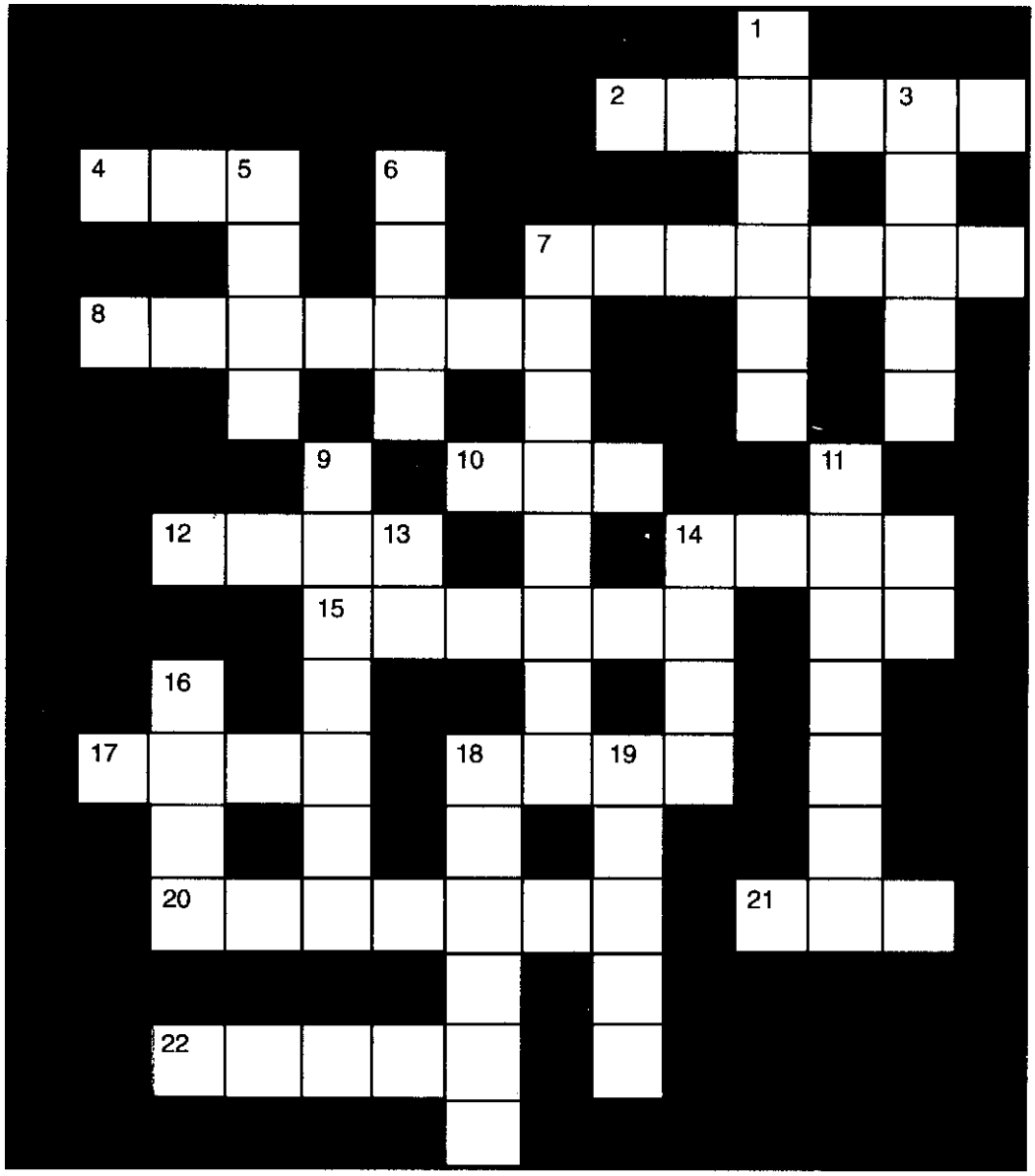
## THE 10 MOST HAZARDOUS OCCUPATIONS FOR CHILDREN

In 1987, the government had identified ten project areas as being particularly hazardous to children:

1. The match industry in Sivakasi, Tamil Nadu.
2. The diamond polishing industry in Surat, Gujarat.
3. The precious stone polishing industry in Jaipur, Rajasthan.
4. The glass industry in Firozabad, Uttar Pradesh.
5. The brass-ware industry in Moradabad, Uttar Pradesh.
6. The hand-made carpet industry in Mirzapur-Bhadohi, Uttar Pradesh
7. The hand-made carpet industry in Jammu and Kashmir.
8. The lock-making industry in Aligarh, Uttar Pradesh.
9. The slate industry in Marjapur, Andhra Pradesh.
10. The slate industry in Mandsaur, Madhya Pradesh.

In these project areas, according to the government, the existing acts will be enforced more stringently and if necessary, the enforcement staff will be strengthened. The families of child labour will be covered under ongoing anti-poverty programmes. There will be formal and non-formal education for working children. Special schools will be set up for child workers where provision for education, vocational training, supplementary nutrition, health care, etc, will be made. If necessary, stipends will be given to children taken out from the forbidden employments to compensate for their loss in earnings. Efforts to create awareness through social activists and by other means will be made to educate and convince people regarding the undesirable aspects of child labour.

"A painter told me that he had worked in a spray painting unit for 15 years. He started working at the age of 10. After five or six years of working 20 hours at a stretch, he found that his body would get very hot and he felt like hitting someone. He said that for 5 or 6 years this went on. His temper always ran very high and many times he felt that he was close to murdering someone. According to him, this was a physiological condition and not just a psychological state. He could actually feel the blood rushing to his head. Finally, he left the job because he felt that he might not be able to control himself. He thinks that this was due to the combined impact of paint thinners, the bright lights, the heat of the ovens and the long hours of work. He was all right soon after he changed jobs. Now he has set up his own spraying painting unit where he employs both children and adults; for his own son, his plans are to remove him from there and get him to do some other work."



# CROSSWORD PUZZLE

## CLUES

### Down

1. When glass in a liquid state it is called _____glass. (6)
3. The name of the island near New York where immigrants landed in search of a prosperous future. (5)
5. Coal produces ... . (4)
6. Synonym for cold. (4)
7. Area in india known for its match stick industry. (8)
9. A major carpet manufacturing area in India, not mentioned in this book. (7)
11. Tiny bone within the ear. (7)
13. Second note of music, beyond the hearing capacity of the worker subjected to noise pollution. (2)
14. Coal is found in the _____ . (4)
16. A biodegradable material found on trees. (4)
18. It was in this European country that tours of sewers were first organized. (6)
19. Stench / body odour. (5)

### Across

2. Essential safety equipment for dealing with chemicals. (5)
4. Dangerous head load. (3)
7. Moving part of loom. (7)
8. Major carpet manufacturing area India, adjacent to Mirzapur. (7)
10. Sensory organ that is easily damaged. (3)
12. Often the effect of noise is that we become unable to ____ .(4)
14. Occupation health hazard of a chimney sweep. (4)
15. A form of garbage. (6)
17. Essential to hold up the roof of a mine or building. (4)
18. Synonym for solid and strict. (4)
20. Dangerous to be near in glass production. (7)
21. Possibly lethal underground. (3)
22. Synonym for poisonous. (5)

**ANSWERS:**
**DOWN:** 1.Molten 3.Ellis 5.Heat 6.Cool 7.Sivakasi 9.Kashmir 11.Cochlea 13.Re 14.Seam 16.Leaf 18.France 19.Reeks
**ACROSS:** 2.Gloves 4.Ash 7.Shuttle 8.Bhadohi 10.Ear 12.Hear 14.Soot 15.Sewage 17.Beam 18.Firm 20.Furnace 21.Gas 22.Toxic

# CHEMICALS

*An arsenic oxide was included in bread in the Victorian Age to make it white. Today's batch of bread may include new food additives, to the 2,500 already available to food technologists in the west.*

You all read about chemicals that are used to make animals fat and drugs that are used to make people thin; sprays that are used to make fruit look as smooth as plastic; deodorants to take away our human smell and synthetic odours to make us smell again; cosmetics to make crinkly hair straight and straight hair curly!

The market is flooded with new products. It is estimated that over half a million separate substances are in daily use all over the world. Further about 30,000 new substances are manufactured every year.

All these find their way to our bodies - the colour in the squash bottle, ajino-moto, preservatives in our jams and ketchup, shampoo and conditioners.....the list is never ending.

## WHAT CHEMICAL IS IN YOUR `MITHAI'

**Look around you. List all the things that you use daily which are chemical based. For eg. washing soap, cleaning powder, toothpaste.**

**Look at the label. Write down the ingredients and check with your chemistry teacher the chemical composition of each ingredient.**

Experts have noted that methanal yellow and other prohibited colours used for making sweets and other fast food items can cause stomach ailments, degeneration of male reproductive organs, anaemia, blindness and brain damage. Similarly aluminum foil used in place of silver foil to decorate sweets can accumulate in the bones and lead to alzheimer's disease in old age. Even khoya and saffron are known to be substituted by starch and dyed maize cob tendrils, respectively. About a year ago, a vendor in Ahmedabad, was caught for using oxalic acid, normally used for cleaning the floors and toilets, in his "panipuri" preparation.

The Times of India 1/8/94

BEWARE! The next `boondi ka laddoo' that you put in your mouth from the local `mithaiwalla' may have chemicals that are poisonous.

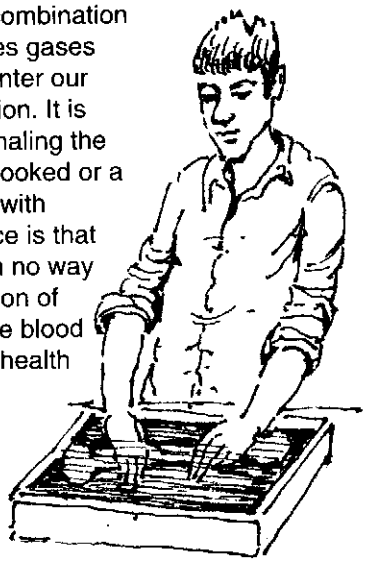
Although our body's defence mechanism provides protection against attack from many chemicals, if these defenses are overloaded then the health may be impaired ranging from a slight skin rash to a malignant tumor with fatal consequences.

Unfortunately, no one quite realises the risks involved in using these products because the industry deliberately conceals the chemicals used behind trade names and codes.

Even though the manufacturers are supposed to test the harmful effects of chemicals before introducing them into the market, this is rarely done. More often than not, the hazards of a chemical are recognised only when signs of ill health begin to appear and by then it is too late. The workers who work with chemicals are exposed to more than one chemical at a time. The effect of the combination of these toxic substances is quite lethal.

## HOW CHEMICALS ENTER THE BODY

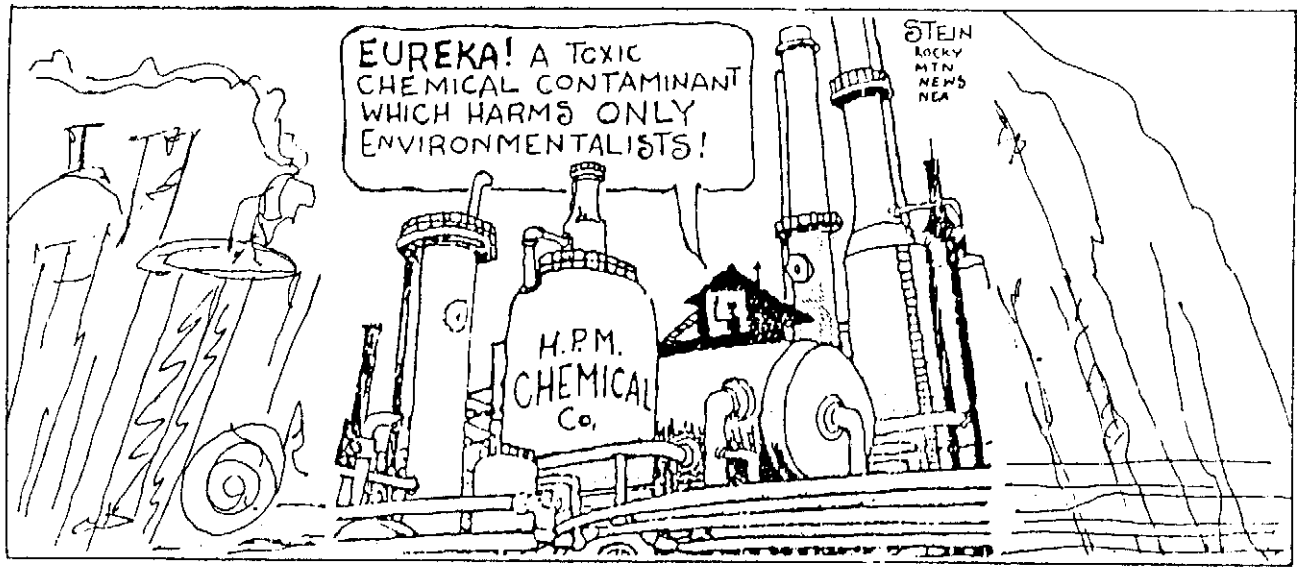
**a) INHALATION:** Breathing in chemicals is the most common route of entry and gets absorbed in the blood stream. Each chemical or a combination of chemicals produces gases and vapours which enter our body through inhalation. It is the same thing as inhaling the smell of food being cooked or a room being mopped with phenyl. The difference is that whereas these are in no way harmful, the absorption of chemical gases in the blood stream cause major health problems.



**b) SKIN CONTACT:** The thickness of the skin along with its natural covering of sweat and grease provide some protection from chemicals entering the body. However, prolonged handling of chemical agents and powders causes rashes in the skin. If you wash clothes and vessels daily, your hands will become rough. Similarly, there are 'corrosive substances' like acids and alkalis which attack the skin directly. Some cause dermatitis, skin cancer, and some easily penetrate the skin and enter the blood stream.

*Did you know that the solvent used as thinner in car workshop is xylene, a narcotic agent and also suspected of causing cancer? While spraying paint, the workers occasionally feel dizzy or sick as a result of breathing xylene vapours. A worker would inhale about a teaspoon of vapour every hour. If he works for ten hours a day he would breathe in a couple of tablespoons full of xylene vapour. This is indeed a lot of chemicals to get into your body each day.*

**c) INGESTION:** This route is not so common. It means the swallowing of toxic substance-either by putting contaminated fingers in your mouth or through eating/drinking in a presence of contamina ted area. No wonder, your chemistry teacher insists that you should wash your hands after conducting experiments--before you eat or drink, anything.




A wide range of substances and processes are used to make goods and provide services that we take for granted. Soaps, detergents, perfumes, dyes, medicines etc. are things that are used all around us-- in our kitchen, office, garden, school, hospital.

The workers producing these goods are exposed to biological hazards. These are hidden hazards as different from physical ones and therefore are more dangerous. The biological problems do not arise immediately. It is not like a wound/ broken bone. It takes its own course of time and therefore is more harmful. These can be:

Cancer
Reproductive hazards
Neurological disorders
Liver and kidney disease
Heart disease
Lung disease
Skin diseases
Allergies and sensitization

It is unfortunate that the workers who work with products are not aware of the OHH that they deal with in the course of a day. It is only a part of life, something that they do' to earn their livelihood.

## Good Personal Hygiene

The importance of good personal hygiene must be recognised in preventing the harmful effects of poisonous substances. For example, dirty hands can easily transfer such substances to the mouth, eye and face. Here are some other important tips to remember and practice:

* If you work with dangerous dusts, take a bath and wash your hair after work.
* Periodically change dirty work clothes.
* Avoid eating food beside the workbench or machines.

Make sure that your working environment comes upto standard. Do not get old before you need to!

*Did you know...*

** The thickest skin (about 3mm) is on the soles of the feet.*

** You have about 3 million sweat glands all over your body.*

## ACID ON PETALS

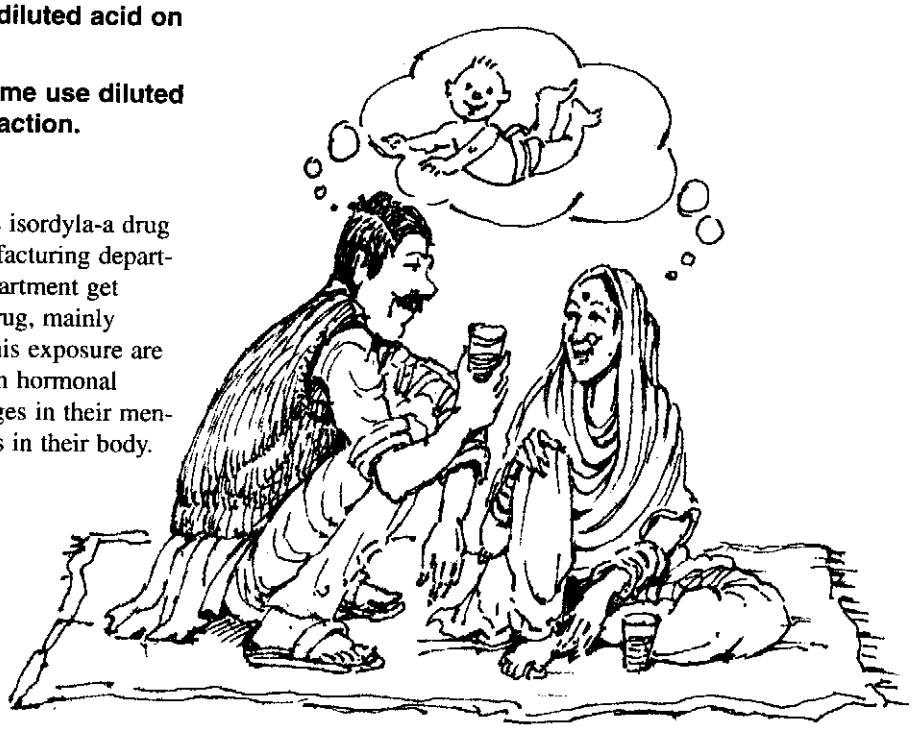
**Acid is an agent we use at home to clean blocked drains, bathrooms, kitchens, etc. The dilute acid that we use is not harmful, but one is still careful about not touching it directly because the skin tingles and burns,**

**When produced in large quantities, the acid in its pure form often singes the workers.**

**Take a flower petal. With the help of a dropper, put a few drops of undiluted acid on it. Watch the reaction.**

**Take another petal. This time use diluted acid. Note the differences in reaction.**

A factory in Bombay produces isordyla-a drug for heart ailments. Men in the manufacturing department and women in the packing department get exposed to the constituents of this drug, mainly isosorbide dinitrate. The effects of this exposure are fatigue, headache, vomiting and even hormonal disorders. Women complain of changes in their menstrual cycle due to hormonal changes in their body.



The extent of hazardous substances varies enormously between different jobs and industries. But all workers in all work places face some risks.

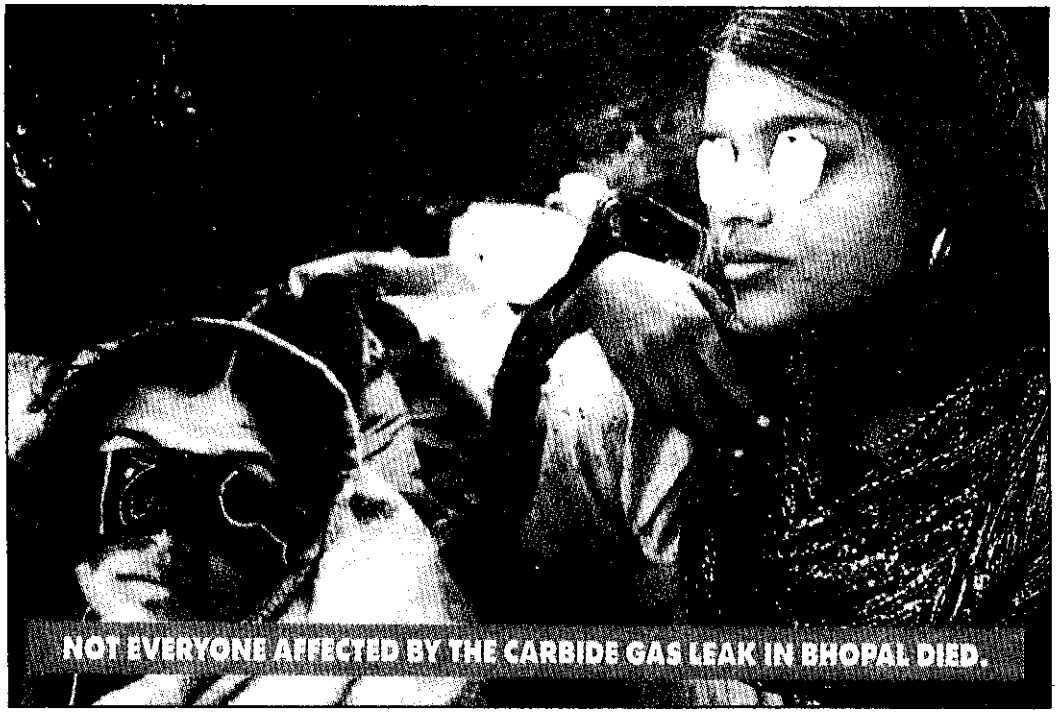
For example, workers in the given industries face exposure to either a single chemical or a combination of chemicals.

| | | |
|---|---|---|
| acids | dyes | fumes |
| aerosols | herbicides | drugs and anesthetics |
| asbestos | ink | oils |
| cleaners/detergents | paints | pesticides |
| disinfectants | resins | solvents,glues,adhesives |

We pop pills for any ailment- cough, cold, headache,fever-to name a few common ones. Then there is penicillin, tetramycin, sulpha based drugs for more specific problems.

If you ever saw the pharmaceutical factory we visited, believe me you would not take a paracetamol for a long time. This factory produces the paracetamol in bulk and then sends it to other companies which turn it into tablet form. The powder was being made in a huge, rusty drum. The room was dingy and dirty. There was nothing hygienic about the place.

The workers who manufacture these tablets get exposed to various drugs that may cause skin-disease and in some cases lung problems. The conditions they work in are unhygienic and definitely unsuitable for making life-saving drugs or any other medication.




## BHOPAL : A CASE STUDY

In the early hours of 3rd December, 1984, a cloud of poisonous gas was released from a pesticide plant in Bhopal. It descended on huts and houses around the plant, making visibility difficult.

There was panic. Those who were awake, complained of an unbearable eye-irritation, difficulty in breathing and a desperate desire to get away from that area. Thousands of others woke up from their sleep unable to breathe, coughing, spluttering and vomiting. Hundreds choked to death because of an accumulation of fluid in the lungs -- in effect, drowning.

An estimated 2,500 people died in that one night. But its effect can still be seen on the survivors. Men, women and children lost their eyesight, developed respiratory problems and consequently lost their ability to work.

What was this poisonous gas? This was the toxic methyl-isocynate (MIC) which "leaked" out of the Union Carbide pesticide plant. MIC is a colourless liquid. It is lighter than water, but twice as heavy as air. This means that when it escapes into the atmosphere it remains close to the ground. It is used in the production of polyurethane foams, plastics and as an intermediate chemical in the last stage of pesticide or drugs manufacture.

MIC can also cause asthma, bronchitis, pneumonia, pulmonary infection and other respiratory ailments. Heavy exposure causes death - either by suffocating the tubes carrying air to the lungs or by `drowning' as body fluids released by the irritating gas accumulate in the lungs. This is what happened to the people who died on that fateful night.

If you are lucky or unlucky enough to survive this onslaught, you are more susceptible to lung infections, kidney failure and liver problems. It can cause permanent blindness, brain damage and lung cancer.

Unfortunately, this deathly chemical has no antidote or treatment. All one can do is to supply oxygen, administer sedatives and later give physiotherapy to the lungs.There is no cure -- only slow death.

These chemicals are poison for both the people who produce them and the people who use them, yet they are an important part of our lifestyle in the 20th century. Bhopal forces us to question the value given to chemicals in our lives.

## THRESHOLD LIMIT VALUE

When you are working in your chemistry lab, you inhale fumes from different solutions and acids. The acrid smell of H2S surrounds not only your class but also the neighbouring class-rooms. Over time, the smell and fumes do not bother you - it is a part of your lab work !!

When a worker enters a chemical plant, due to the smell, the first response of the mind and body is "GET OUT OF THIS PLACE". Later,this survival reaction of the body gets blunted and he gets used to the lingering foul smell. Yet, the action of the chemicals on the body does not stop, it continues.

In a starch manufacturing company that we visited during the writing of this manual, we felt choked and could not breathe in certain areas. The fumes and smells were acrid. The storage drums were rusted and looked as if they would crumble apart any day. But the workers worked-apparently not bothered with the smells and fumes.You see, their bodies had got used to the atmosphere !!

Threshold Limit Values are given to certain chemicals. TLV's refer to the concentration of chemicals in the air. It is believed that for every chemical there is an average limit which will not affect the workers working on a daily basis. Another important thing to bear in mind is that these values are given to a single chemical. No one knows what value to give when more than one chemical is brought together to manufacture a product.

There are meters to ascertain if a chemical is present in excess of the harmful quantity. Two drops of sulphuric acid in a large room may not be dangerous but fumes of half a litre of the acid in a small room is definitely a cause of anxiety.

Unfortunately these limits are rarely adhered to in the factories all over the world. Workers continue to work in places which are veritable death traps because they are ignorant or have not been informed of the dangers they are exposed to.

*While jogging an adult breathes in about 90 litres of air per minute which is 15 times more than when he/she is relaxed.*

## MAKING A MODEL LUNG

**By making this model, you can see how your diaphragm helps to make your lungs fill up or empty out. With an elastic band, fasten one balloon to the end of a ballpoint pen barrel. This is the "lung". Position the tube in the neck of a plastic bottle, and make an air-tight seal with modelling clay. Cut off the bottom half this bottle. Cut across a second balloon and use it to seal the bottom of the bottle -this is the "diaphragm". Fasten a string to the second balloon with tape.**

**When you pull gently on the string, the air pressure inside the bottle falls. Air from the outside then flows into the intact balloon, and it begins to inflate. This is just what happens to your lungs when your diaphragm contracts.**

**If you let go of the string, air pressure inside the bottle rises. Air is forced out of the balloon. It quickly deflates, just like your lungs do when you breathe.**

*Did you know that normally an adult breathes in 15,000 litres of fresh air every day - about the amount contained in a small bedroom.*

## SUFFOCATION

**In the chemistry lab with your teacher present, conduct the following experiment:**

**- Close all the doors and windows of the lab.**

**- Make the H2S in sufficient quantity so as to let the fumes engulf the lab.**

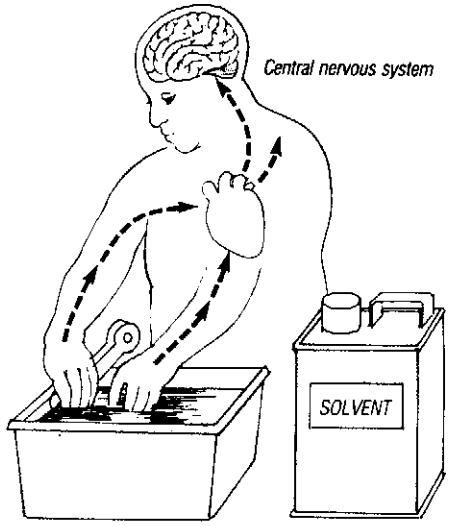
**- Try and stay there and work on something else like writing your observation note book.**

**- How many minutes can you tolerate this smell?**

**If you feel faint or nauseous please leave the lab immediately. Can you jmagine the effect on workers who are exposed to this situation daily?**

## SOME COMMON SOLVENTS

| Product | Use | Symptoms |
|---|---|---|
| Acetone | Solvent and dissolvent, manufacture of other chemicals and drugs | Inhalation or ingestion of large amounts may induce headache, dizziness, fatigue, fainting. Repeated contact may cause eczema. Severe eye irritation if splashed in the eye. |
| Industrial petrol | Solvent, dissolvent, and de-greasing agent | Fumes irritate the eyes and respiratory passage. Inhalation/ingestion results in headaches, nausea,dizziness,fainting. Inhalation over long period can damage nerves.Repeated contact may cause eczema. |
| Methanol | Solvent, dissolvent, and anti-freeze agent. As an additive in motor fuel and industrial alcohol. | Inhalation/ingestion or contact with skin can induce dizziness, nausea, headaches,disturbed vision. Absorption of small amounts over long periods can damage the eyesight. Repeated contact with skin can cause eczema. |
| Methyl Chloroform | Solvent,dissolvent, de-greasing agent. In the drugs and petroleum industry. | Inhalation/ingestion of large amounts can cause headaches, nausea, fatigue,dizziness,fainting It affects the heart and produces drop in blood pressure. Repeated contact with the skin produces eczema. |
| Xylene | Solvent. In the manufacture of drugs, dyestuff,fibres and other chemicals. In many petroleum distillates such as motor fuels. | Fumes irritate the eyes and the respiratory passage.Inhalation or ingestion of large amounts can induce nausea,dizziness,fainting. Absorption over long periods can damage the liver and kidney. |




*Solvents can reach the brain both through the lungs and through the skin. The brain's cells contain a lot of fat and therefore attract fat-dissolving substances.*

## MAKE YOUR OWN LIQUID SOAP

**Use a cocktail of chemicals to produce something useful for your home. Be careful to use the amount specified, as excess of something could be dangerous. Eg. excess of caustic can cause blisters on the hands or skin.**

### You will need:

**6 litres water**

**200 gms. caustic soda**

**200 gms. T.S.P.**

**100 gms. sodium**

**500 gms. urea**

**1 litre acid slurry**

**1/2 ounce lemon/citronella oil (optional)**

### Follow these steps:

**1. Put the water in a clean bucket and add the caustic soda to it. With the help of a wooden stick stir for 15 minutes.**

**2. Add the T.S.P. powder and stir for 10 minutes.**

**3. Add the sodium and stir for 10 minutes.**

**4. Add the urea and stir for 10 minutes.**

**5. Lastly add 1 litre acid slurry, which is the thickening agent and stir for 10 minutes.**

**The lemon oil or any other perfume may be added at this stage.**

**The liquid soap must be allowed to stand for 24 hours, after which it is ready for use.**

# 120 killed in TN bus-tanker mishap

PTI

The Times of India News Service and Agencies

MADRAS, March 12.

In the worst-ever road accident in Tamil Nadu, 120 passengers were today charred to death in a head-on collision between a petrol tanker and a Bangalore-bound bus around 11.30 a.m. near Sriperumpudur, some 50 km from here. Those killed included members of a marriage party travelling in a tractor trailer that was behind the bus. All three vehicles were gutted after the collision.

Ten persons have been admitted to hospital with severe burns. The trailer, carrying over 70 "baaratis", mostly women and children, got engulfed in fire as the fuel tanker exploded on collision. The bus belonged to the public sector Jayalalitha Transport Corporation.

According to a report received here, the lone survivor among bus passengers managed to break out from the burning bus by smashing a window pane.

The report said the Bangalore-bound bus met with the accident when it took to the road after a brief halt at a wayside eating house. The police are inquiring into a report that the head-on collision with the tanker took place as the bus tried to overtake the tractor .

Flash fire caused by the tanker explosion accounted for the high toll. Bus passengers found themselves trapped inside for the only exit was on the front side which was badly damaged under the impact of the collision. They were charred to death on their seats.

# 17 killed as acid truck turns turtle

LUCKNOW, March 7 (HTC)

At least 17 persons were charred to death and 13 others received serious burn injuries when a sulphuric acid laden minitruck overturned last night on the Delhi-Hardwar national highway in Muzaffarnagar.

The 13 seriously injured persons with multiple burns have been hospitalised for treatment. Of them at least five are stated to be in a critical condition and were battling for their lives till this evening.

According to official reports reaching here from Muzaffarnagar, the mini truck carrying 50 sulphuric acid cane was also carrying 30 passengers going from Meerut to Saharanpur. While the truck driver lost control over the vehicle, it skidded into a ditch following which at the acid cans burst open.

The acid flowed from the cans with great velocity leaving no chance for the truck occupants to escape. Most of the occupants were burnt to death on the spot.

# Benzene may have caused high toll

By V.R.Mani

The Times of India News Service

KANCHIPURAM, March 14.

The toll in Sunday's road disaster at Chenthamangalam, about 15 km from here, was high because the tanker, one of the three vehicles involved in the collision, was carrying highly-inflammable benzene. Fifty-one people died in the accident.

It is felt that the some of the passengers may have inhaled the fatal benzene vapours and got burnt in the flames that engulfed the tanker, a Bangalore-bound luxury bus and a tractor- trailer carrying a marriage party.

Chinglepet SP Ramesh Kudawal said the initial reports of a higher toll were based on speculation that everyone in the tractor-trailer and the bus had died. At least 20 passengers escaped, he said.

However, the fact that some charred bodies were found on the bus seats indicates that many passengers had no time to react. The body of one person, who apparently tried to escape through the front door -- the only exit - was found on the footboard. The door seemed to have got jammed

The intensity of the flames prevented rescuers from coming within 50 metres of the burning vehicles. Mr Kudawal said he could see the flames from a distance of three km. The flames proved too quick even for a snake, whose remains were found in the charred vegetation.

# Murder, not accident

**In what is rated as the worst ever road accident in western UP, 17 people were killed and 14 others critically injured when the truck they were travelling in overturned near the Roorkee checkpost on the Delhi-Dehradun highway on Tuesday night. What made the tragedy even more gruesome was that the casualties did not occur just because the truck had overturned, but from the burns they received as the vehicle's cargo of acid containers split over their bodies. It is open to question how a truck carrying 48 plastic containers filled with sulphuric acid could carry another three dozen passengers without inviting a fatal accident. But it is no point quoting the rules because the rules are observed mostly in the breach ,**

The survivors blame the "rash and negligent" tanker driver for the disast[illegible] They said there was a sta[illegible] to bail out of the bus. [illegible] were found in the

# Step on the gas

# Absconding truck driver nabbed

## Prevent what you can't cure:

Big industries are now rethinking their role in protecting our environment. The trend is to reduce chemical waste at the beginning of the production process.

Organizations are offering consultancy for safer and cleaner technologies. The idea is to bring about a system where the industries produce chemicals that can be manufactured, transported, used and disposed of safely.

## Transport of Hazardous Materials

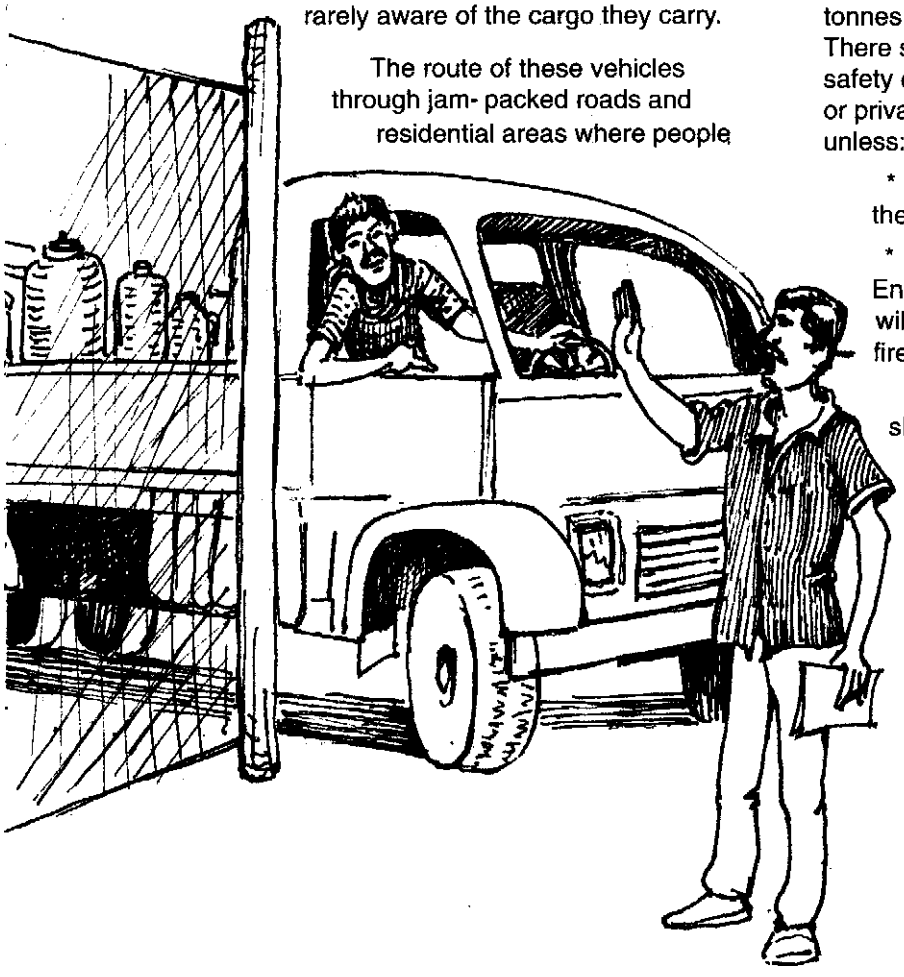
Soon after the Bhopal gas tragedy, the government started consciously recognising the existence of hazardous industries and the need to effectively control them.

Various committees were set up to examine the risks posed by hazardous industries, both to the people and the environment. But, very little has been done to control the danger posed by the road transportation of this hazardous chemicals which is a risk to society.

There is a great possibility of a mishap in transit due to various reasons:

Untrained and ill-informed drivers who are rarely aware of the cargo they carry.

The route of these vehicles through jam- packed roads and residential areas where people face the risk of being exposed to a fire or a leak.



The absence of any information to effectively deal with an emergency situation.

One reads in newspapers about deaths by fire from oil-leaks in tankers. These accidents take place because there are no rules which govern the transport policy of the chemicals. The industry uses badly maintained vehicles - which look ready to fall apart and collapse under the strain of their cargo.

The total traffic of chemicals and drugs according to the National Transport Policy Committee report, is projected to grow from 4.61 million tonnes in 1982-83 to 11.47 million tonnes by 2001. There seems to be a growing need to have strict safety codes in the area of road safety. No public or private carrier should carry hazardous chemicals unless:

* The carrier has special labels representing the nature of the hazard.

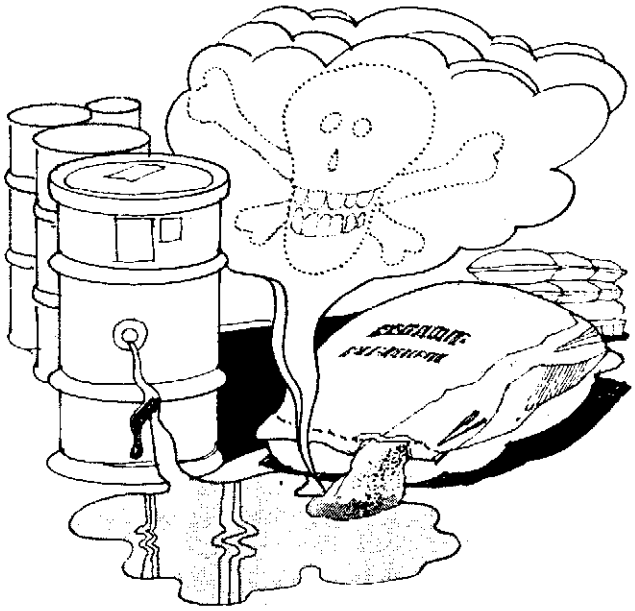
* Drivers should carry written instructions in English, Hindi and the regional language which will have first-aid treatment, how to deal with fire, spillage or accident.

* A summary of these instructions should be carried by the driver in the form of a card called TREMCARD (Transport Emergency Card).

## Environmental Anguish In Love Canal

In the '40s and '50s, an abandoned canal in New York State's Love Canal neighbourhood became a dumping ground for toxic wastes produced by Hooker Chemicals and Plastics Corp. Later, the company filled up the land and gave it to the developing city of Niagara Falls, which constructed houses on it. By 1978, subsurface leakages of toxic chemicals were detected in the basements of the houses.

Investigations revealed a high incidence of chromosomal damage among the residents, caused by long-term exposure to toxic gases, and the people were evacuated. After prolonged litigation, the company had to pay $20 million as compensation to the 1,300 former residents and also bear the cost of cleaning up the area.



***Products incorrectly stored near each other can cause risks to health, explosion and fire.***

There is a lack of awareness amongst many factory owners not only about the chemicals they use but also about dumping the wastes. This then extends to the workers in the factories as well as the neighbourhood and community.

Several factory owners countrywide confessed that they simply dump waste even though it is toxic. The guiding logic seems to be that they have to dispose of it somewhere and because the government has not provided safe facilities, they can dump it wherever it is convenient to them. Several pollution control officials also subscribe to this view and point to the industries utter "helplessness".

### *THE SEVESO DISASTER*

*Seveso, an Italian town near Milan is the scene of one of Europe's worst chemical disasters. On 10 July, 1976, a chemical plant erupted spilling a contaminated cloud of gas over the residential areas nearby. As a result of this, 70,000 animals died or were later slaughtered. The health of 30,000 people was put at risk. The disaster brought to public notice one of the most toxic chemicals to have been discovered-dioxin.*

*The chemical plant in Seveso manufactured trichlorophenol(TCP), a chemical used in making a very powerful weed killer. TCP is made at a temperature of 180 degrees Centigrade. If overheating occurs and the temperature rises above 22O degrees Centigrade, the process "runs out of control" and explodes.*

*This is exactly what happened that fateful Saturday afternoon. A large cloud of gas was released into the atmosphere. Some eye witnesses described it as- "The cloud was some five miles long, dropping small white crystals like snow on the roofs and gardens below. An acrid mist stung people's eyes and skin. It was difficult to breathe. The next day, shiny, oily poisonous coating covered houses, plants, vegetables and trees."*

*Life went on as normal. People continued to eat fruits and vegetables from their garden.Children played in the park and swam in the open air pools. Though the mayor knew the dangers of all these activities,he did not warn the people to take precautions. After a couple of days, people began complaining of headaches, swollen abdomens, back pains. Children's faces, arms and legs began to show ugly rashes. Slowly, birds and animals started dying.*

*The analysis of the cloud contents done in Switzerland gave the horrifying news thirteen days after the incident- that it cotained 2-3 kilograms of dioxin, enough to kill 10,000 people!*

*Dioxin is known to cause severe damage to the kidneys, the liver, the stomach, the intestines and many other organs. People in the Seveso area showed signs of kidney and liver damage. Many people also suffered from chloracne a nasty form of acne. Chloracne can disfigure people for upto 15 years.*

*Over 2000 people were evacuated, about 70,000 animals were slaughtered.*

*The company which owned the factory had not immediately informed the local authorities or even the workers about the danger from dioxin. Because of this no safety measures were taken.When the people knew of the danger they ordered an evacuation.*

*At first only children were evacuated, but later adults were evacuated as well.*

*The effects of the Seveso disaster are still not over, years after the explosion. Forty-one barrels of the most dangerous waste from the area were destroyed only in 1983.It takes years for a place to recover after this sort of an accident and it takes the people a lifetime to come to terms with their tragedies..*

# SILICOSIS

Clay is a very versatile matter. Think of your kitchen tiles, bathroom tiles, sink, cups and saucers, mugs, plates - they are all made with clay. The process of mixing different types of clay together with the firing process is what produces this wide range of objects - some of which are a necessity in our day to day lives.

What is ceramic? It is a general term used to describe the art of making things from clay. Clay is a simple,formless material with little value until the potter starts working on it. By processing, shaping and decorating it, he changes it into a useful or a beautiful object.

Ceramic (this is the term we will use in this chapter) was used even in ancient times. For eg., on the continent of America are found the painted pots of the Pueblo Indian and the exciting shapes of the vessels of the Incas. In India, pots and decorative articles were found at Mohenjodaro and Harrapan excavation sites. The Chinese have a ceramic tradition reaching far back into history. During the T'ang period, tomb figures of men, women, horses and camels were potted with such skill and artistry that till today they are considered masterpieces of world art.

Even with the inventions of science, working with clay presents a challenge. Firing a kiln and awaiting either the pang of disappointment or the thrill of success still creates a sense of suspense.

Ceramic is used in tiles, murals and decorative articles. Ceramic tiles have replaced cement and bricks in many offices and homes. Porcelain figurines, decorative articles, plates- these are a delight for our eyes.

Clay is a mixture of aluminium, silicon and chemically combined water which in most cases, contains various impurities which gives special characteristics. Common clays are kaolin, ball clay, fire clay, stoneware and red clay.

Before a potter starts using the clay, it goes through a long process. Various types of stones are crushed into powder. They are mixed with water. Then, it is pounded with feet. This process makes the final clay which is used to produce various things for our use.

The process of crushing the stones to produce clay, raises a fine dust in the atmosphere. This causes severe respiratory problems. The stones contain silica particles which are smaller than 5 micro millimeter and are invisible to the naked eye. Yet, the damage they cause to the lungs is irrepairable.

Inhalation of this silica dust over the years causes silicosis, a severe respiratory disease which harms the lungs.The longer you are exposed to dust, the more certain you are to be affected. One single exposure cannot cause you any harm. Silicosis is evident only after seven to ten years of exposure.

As soon as a worker joins work in a ceramic factory, he gets a cold and sneezing fits. The fine dust particles of silica enter the alveoli and cause the cold. We have talked about this in our chapter on the textile industry. Inhalation of dust over a period of time causes difficulty in breathing, coughing and pain in the chest.

Silicosis has three phases:

I. The worker ignores the cold and sneezing fits.

II. The worker gets tired easily, breathlessness, heart does not function effectively, there is a reduction in oxygen supply.

III. The worker has a feeling of slow suffocation. Silicosis continues even after a worker has left his job. The damage done is irrepairable.

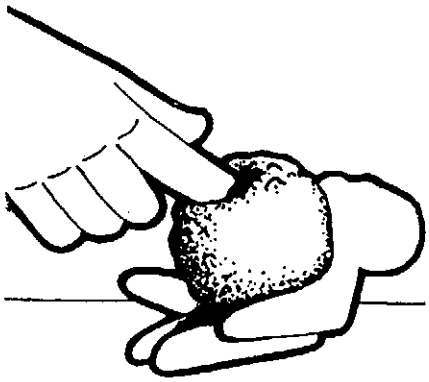
A wide range of people are affected by silicosis for eg:-

* Steel dressing shops
* Demolition work involving furnaces and convertors
* Smelting plants and foundries
* Furnace work
* Sand blasting
* Mining
* Stone crushing
* Pottery work
* Quarrying
* Powder painting
* Stone - metal grinding
* Glass industry.

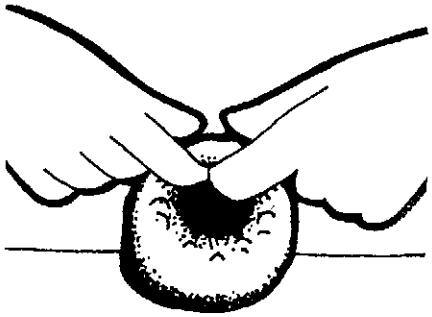
## POTTER AROUND

**Make your own clay pot / vase.**

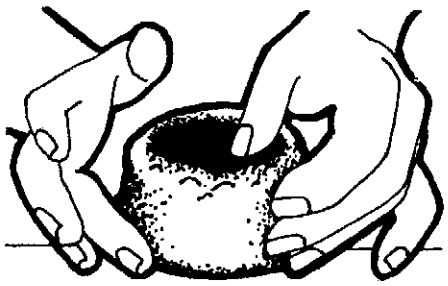
*** Roll a ball of clay, turn it in your hands knead it and squeeze it till it is a nice round ball. Remove all air from the ball by breaking it and rolling it repeatedly at least 20-25 times.**



*** Now using your index finger, carefully make a hole in the ball.**



*** With your fingers, make a wall from the inside outwards. As the ball grows, the walls will become thinner and higher.**



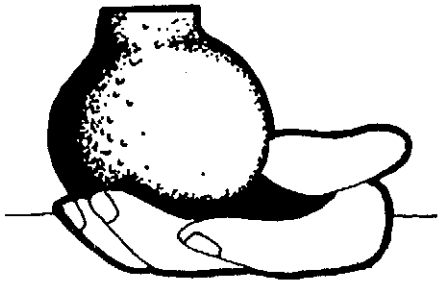
*** If you carefully press the ball together with both your hands, you will have a vase.**

*** If you gently press the opening edge, it becomes fat-bodied.**

*** Carefully press the opening edge together with your finger tips and round it off to give you a rimmed pot.**

*** Leave the piece uncovered in a box till it is hard like leather.**

*** Keep the box in a warm room, out of direct sunlight and away from draught. Turn the piece over as often as needed so that the pot/vase dries evenly.**



*** Take some paint and a thin brush. Design your own motifs and decorate the pot or vase.**

*A COUNTRYSIDE SLOWLY DYING*

*ACC has about 19 cement factories in India and Jhikpani might be the oldest one. The Jhikpani plants production is something like 7,20,000 tons per year. The production has gone up in the last thirty years, but the number of labourers remains static. The factory runs in three shifts round the clock. The twin giant chimneys emanate cement-exhaust. A ten mile radius area around the factory looks like a vast nightmare.*

*Cement-dust that has accumulated and hardened in contact with night-moisture kills vegetation slowly. The trees wither, paddy, lentil and jowar plants give up and die, unable to survive on soil hardened by cement-dust. The peasants and casual mazdoors inhale cement-dust and die of tuberculosis caused by constant accumulation of the dust in the lung. It has never been properly investigated whether tuberculosis found in the area is caused by silicosis or not.*

***-Mahasveta Devi***

# *In slate-pencil units of Mandsaur, silicosis kills 50 each year*

**By A Staff Reporter**

NEW DELHI, March 10. Jamila, a 38-year-old widow, could well be among the 50-odd employees of the slate-pencil factories at Mandsaur, Madhya Pradesh, who are expected to die of silicosis by the end of the year.

A deadly disease, silicosis kills on an average 50 persons working in the slate-pencil factories, every year. So much so, the average life of people who start working in these factories while in their teens, is said to be 35 years.

Silicosis is lung fibrosis caused by the inhalation of dust containing silica. (Fibrosis, in medicine, means a thickening or scarring of connective tissues.)

Despite being a patient of this diesease, Jamila says "I have to work because there is nobody left to feed my children." Her husband Babu Khan had died of silicosis two years ago.

Unable to earn enough for her family, she recently started taking along two of her four young children to the factories. "Even their meagre earnings are a relief," she says. "I know both of them are exposed to this disease but there is little I can do about it," Jamila laments.

# ASBESTOSIS

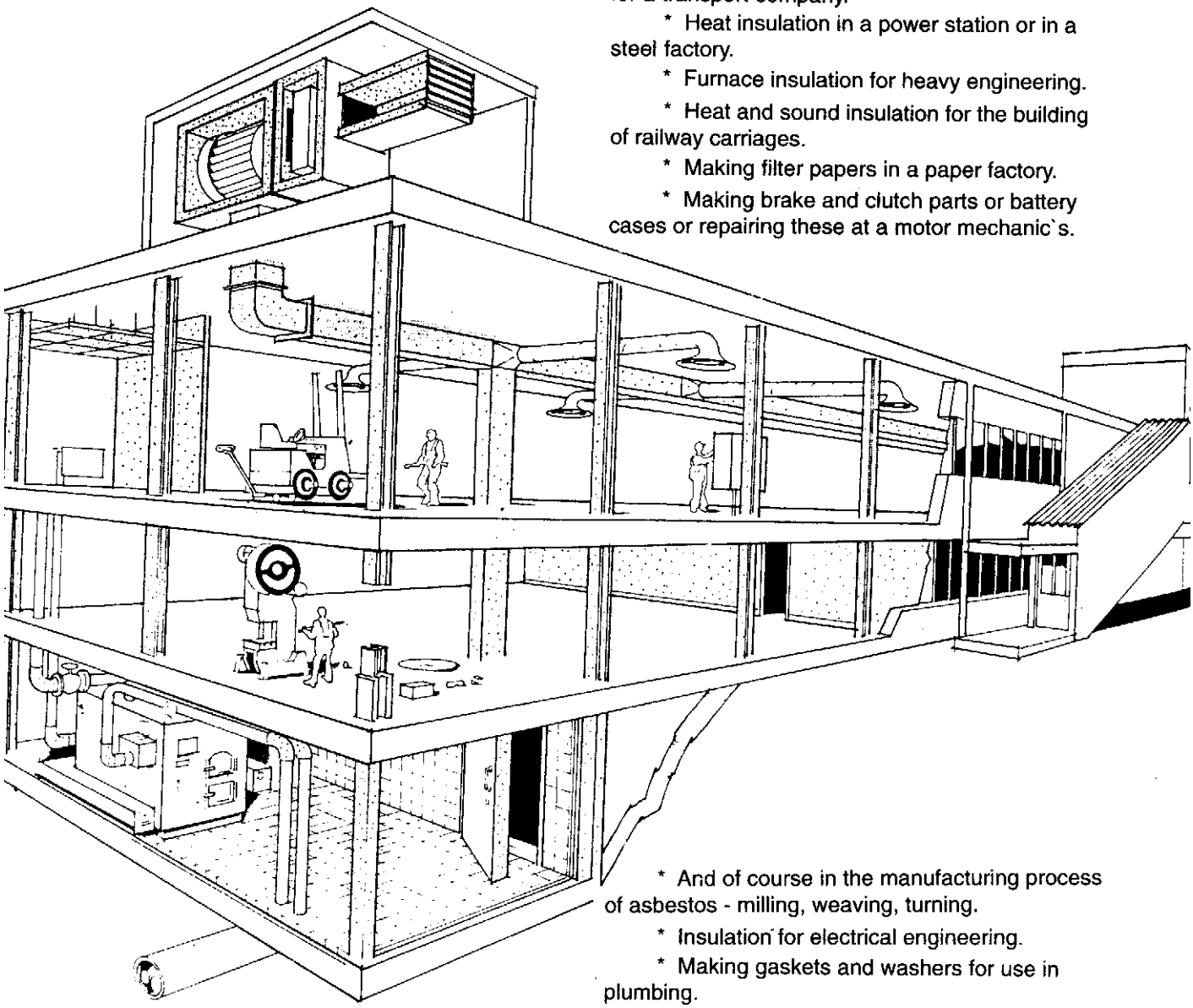
What is asbestos?

It is a fibrous material that resists attack by heat and chemicals, it is very strong and cheap - and can be woven into textiles. As a result it is extensively used in a range of products and processes. Unfortunately however, asbestos is a killer.

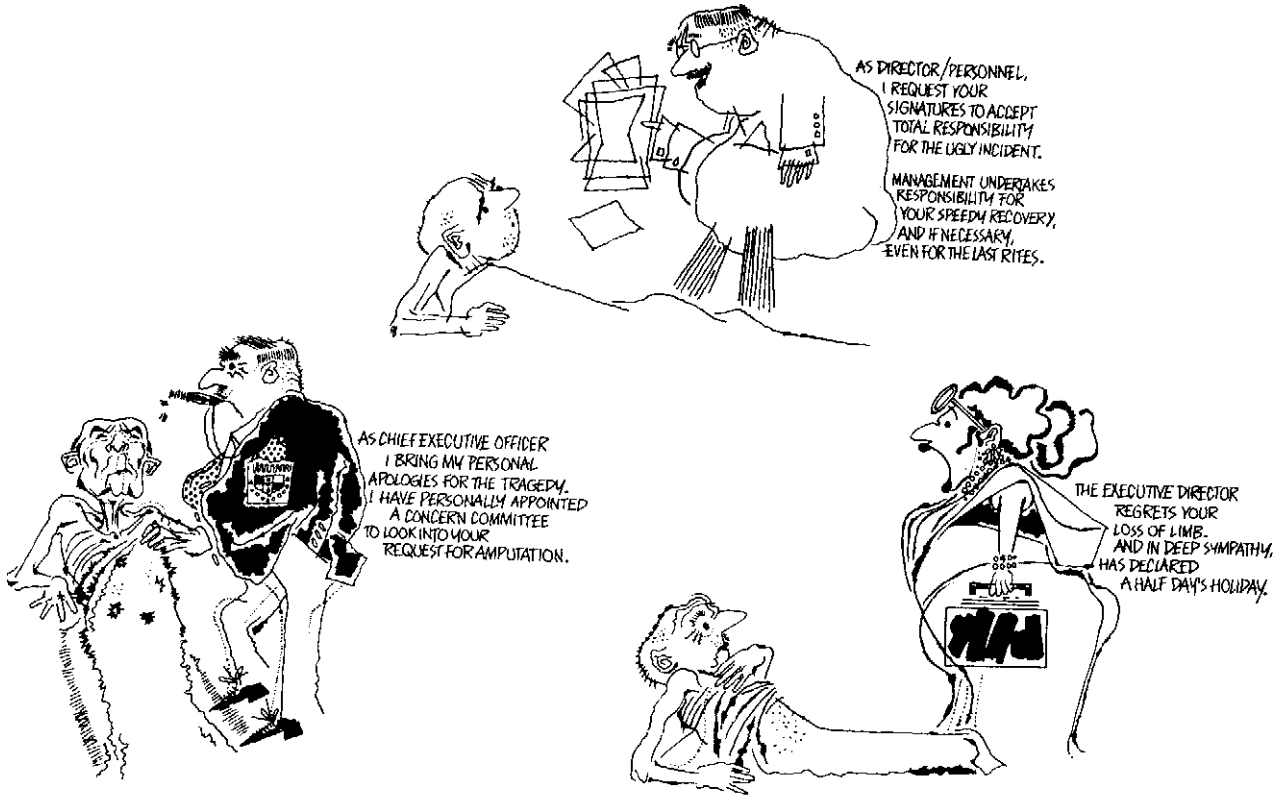
Its major health hazard lies in the fact that it is made up of invisible fine fibres that can cause a range of incurable diseases. Almost every occupation today brings us in contact with asbestos, and because of its widespread use it may well be the worst occupational cancer producing substance ever.

Here are some of the situations where the worker can be exposed to asbestos

* Handling sacks and bales at the docks or for a transport company.
* Heat insulation in a power station or in a steel factory.
* Furnace insulation for heavy engineering.
* Heat and sound insulation for the building of railway carriages.
* Making filter papers in a paper factory.
* Making brake and clutch parts or battery cases or repairing these at a motor mechanic`s.



* And of course in the manufacturing process of asbestos - milling, weaving, turning.
* Insulation for electrical engineering.
* Making gaskets and washers for use in plumbing.


AS DIRECTOR/PERSONNEL, I REQUEST YOUR SIGNATURES TO ACCEPT TOTAL RESPONSIBILITY FOR THE UGLY INCIDENT.
MANAGEMENT UNDERTAKES RESPONSIBILITY FOR YOUR SPEEDY RECOVERY, AND IF NECESSARY, EVEN FOR THE LAST RITES.
AS CHIEF EXECUTIVE OFFICER I BRING MY PERSONAL APOLOGIES FOR THE TRAGEDY. I HAVE PERSONALLY APPOINTED A CONCERN COMMITTEE TO LOOK INTO YOUR REQUEST FOR AMPUTATION.
THE EXECUTIVE DIRECTOR REGRETS YOUR LOSS OF LIMB. AND IN DEEP SYMPATHY, HAS DECLARED A HALF DAY'S HOLIDAY.

**ACCIDENT OR OHH?**

**These three cartoons by Mickey Patel captures the views of the industrialist - who always perceives the workers occupational health hazards as an `accident', or due to some personal failing of his.**

**Develop a short dramatic scene between the two characters depicted in the cartoon. The scene should either begin or end with the line given in the cartoon.**

# RIGHT TO HEALTH INCLUDED IN ARTICLE-21

The Supreme Court has given a shot in the arm to the hard-pressed worker in the country who pay through their nose for the high cost of medical care. It has declared that health, and good health at that, is their fundamental right. It also held that every mamagement is under the constitutional obligation to take care of its workers health during the employment and even after retirement.

A trend-setting verdict indeed. It has further enlarged the scope of article 21 of the Constitution which guarantees right to live with dignity.

But the present judgment, is on a public interest petition filed by the socially conscious Consumer Education and Research Center. It not only concentrated on the health of a few thousand workers engaged in mining and asbestos industries but of those millions as well, who are vending their toil for a square meal or so.

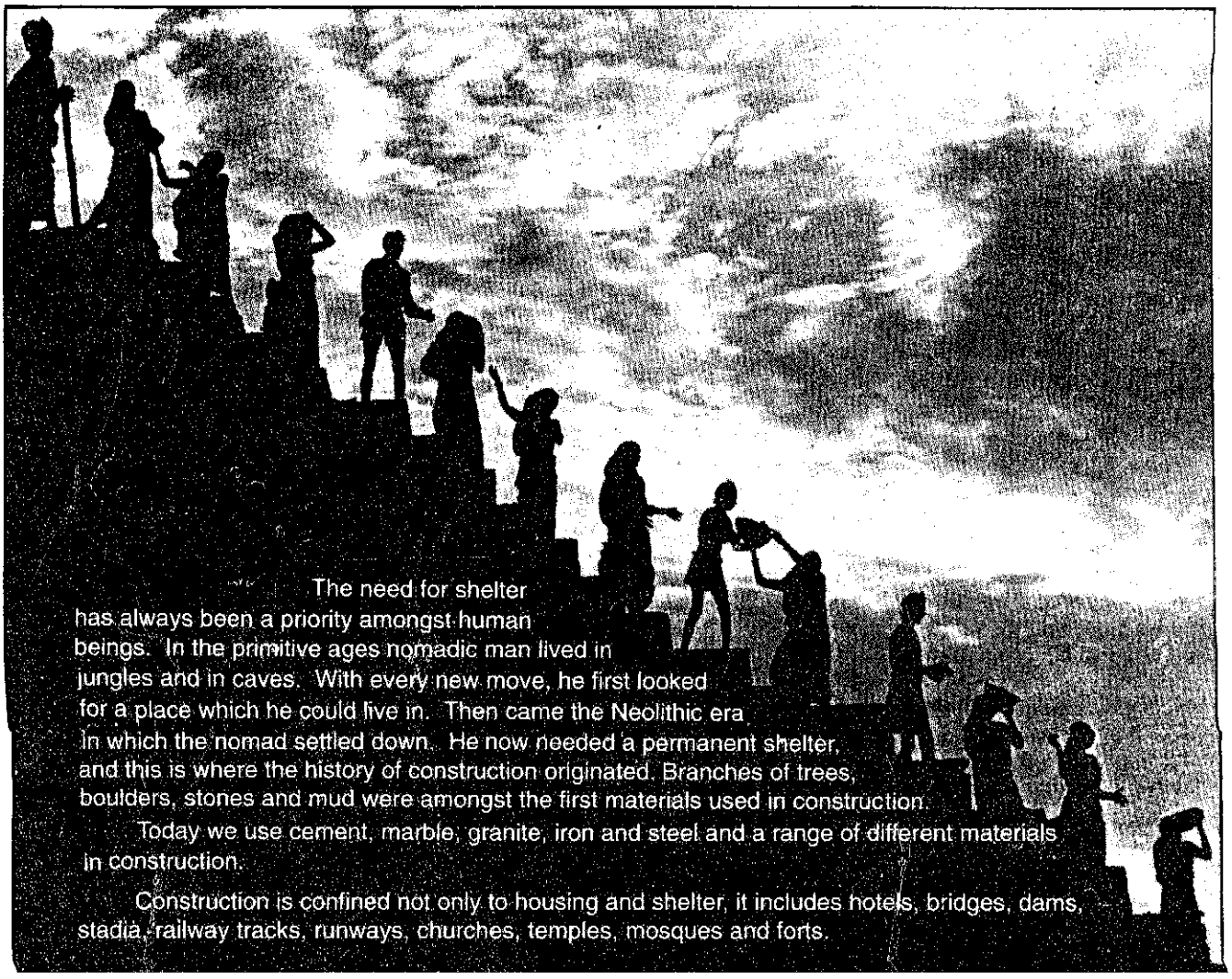
The judges sought to diagnose the deep malaise and felt the pulse of a large number of suffering for suspected "asbestosis", a disease prevalent in asbestos industries, in which victims suffer from cancer and acute lung ailments. The court has directed all factories or companies engaged in the asbestos trade to pay compensation to their present and former employees who are suffering or had suffered from "asbestosis".

The employees would be examined by National Institute of Occupational Health (NIOH) to direct whether they are still suffering from the dreaded disease. In case of positive findings, each such worker would be entitled to Rs. one lakh compensation payable by the delinquent industry within three months of certification by the NIOH.

The court ordered maintenance of a record of the workers health upto a period of 40 years from the beginning of the employment or 15 years after retirement or cessation of employment. All these employees would statutorily undergo `membrane filter test` for detection of asbestosis fibre.

# CONSTRUCTION WORK

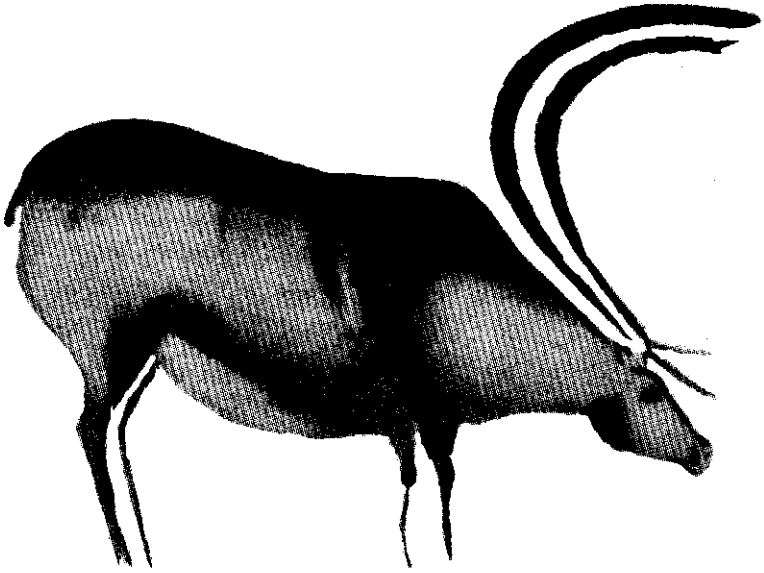
Three years and finally the construction of the new flyover has been completed. The inauguration ceremony is about to take place - colourful shamianas, marigold flowers, engineers, contractors, government officials, every important person in the area is there to welcome the Governor. He congratulates everyone on their hard work and effort to complete this flyover on time. Applause, cutting of the red ribbons, distribution of `mithai`..... But everyone seems to have forgotten the people who actually constructed the bridge. The scores of labourers and their families who lived on the site for the entire period of the construction. The people who had built the bridge inch by inch, putting together concrete, cement, bricks and iron. Where are they? Why wasn't a single person there to represent them, to share in the celebrations?



The need for shelter has always been a priority amongst human beings. In the primitive ages nomadic man lived in jungles and in caves. With every new move, he first looked for a place which he could live in. Then came the Neolithic era in which the nomad settled down. He now needed a permanent shelter, and this is where the history of construction originated. Branches of trees, boulders, stones and mud were amongst the first materials used in construction.

Today we use cement, marble, granite, iron and steel and a range of different materials in construction.

Construction is confined not only to housing and shelter, it includes hotels, bridges, dams, stadia, railway tracks, runways, churches, temples, mosques and forts.



## CAVE MAN ARCHITECT

**Go back in history. Trace how man lived in various era -**

**Neolithic Age - 7,000 years ago.**

**Mesolithic Age - 10,000 years ago.**

**Paleolithic Age - 20,000 years ago.**

**Choose any one of the above eras and design a house keeping in mind how the people of that era lived. You can use any material-chart paper, newsprint, plain white paper, colored paper, crayons, water colours, sketch pens, colour pencils etc.**

Building is a lucrative activity and contributes substantially to the national income of any country. Though it is the largest unorganized sector in the industrial world it is considered the lowest rung of industrial activity.

Labourers are amongst the most marginalised work force in our country. They hail from rural villages or urban slums and belong to the lower economic strata of the society.

* The investment in construction during the last 30 years is greater than the total investment made during 150 years of British rule.

* At present, investment on construction is half of the total investment made towards all development work.

* Between 1951-1985, investment on construction was about Rs.two lakh crores.

* Construction work is larger than any other industry, and is next only to agriculture.

## COST OF CONSTRUCTION

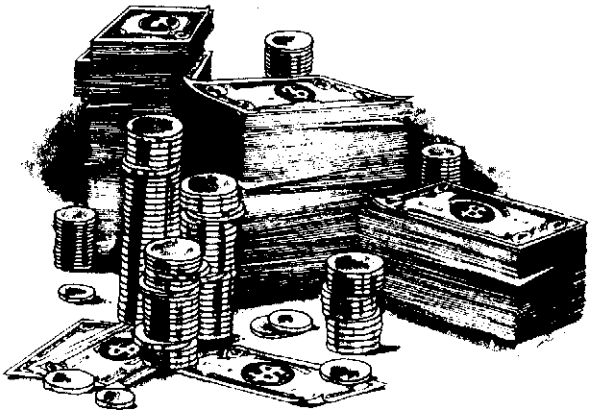
**Select an important building or monument within your town. You may even choose your own house. Do a detailed study of the same, covering the following areas:**

*** List every single material that has been used in the construction.**

*** How long did the construction take?**

*** How many labourers worked on this building?**

*** How much did it cost? Of this, what proportion was paid towards material and labour?**



All construction workers begin their work as unskilled labour and by hard work and years of experience become a skilled worker.

An unskilled worker lifts and carries materials at a site. It is interesting to note how he acquires his skills.

Basics of work are first learnt from the semi-skilled labourer. Having developed these skills, he is given a chance to do a few jobs under the supervision of a semi-skilled worker. (e.g. laying bricks)

This new semi-skilled worker now apprentices himself to the skilled worker and learns the ropes of the trade from him.

## WAH TAJ!

**Unearth some facts about the Taj Mahal, one of the seven wonders of the world.**

*** How long did it take to finish the construction?**

*** From which country does the shape of the dome originate?**

*** Which other monuments in India have used the double dome form of construction?**

*** What material was the second Taj, opposite the first Taj, envisaged to have been made of?**

*** Who finally built a copy of the Taj and failed to achieve the same proportions and grandeur? Where is this mausoleum and what is it called?**

**Answers :**
*About 17-20 years
*Persia
*Subz-Burz. opposite Nizamuddin, New Delhi
*Black Marble
*Aurangzeb. Aurangabad. Deccan Taj

## *A WORKER READS HISTORY*

*Who built the seven gates of Thebes?*
*The books are filled with the names of kings.*
*Was it kings who hauled the craggy blocks of stone?*
*And Babylon, so many times destroyed.*
*Who built the city up each time? In which of Lima's houses*
*The city glittering with gold, lived those who built it?*
*In the evening when the Chinese wall was finished.*
*Where did the masons go? Imperial Rome*
*Is full of arcs of triumph. Who reared them up?*
*Over whom*
*Did the Caesars triumph? Byzantium live in song,*
*Were all her dwellings, palaces? And even in*
*Atlantis of the legend*
*The night the sea rushed in,*
*The drowning men still bellowed for their salves...*
*Each page a victory*
*At those expense the victory ball?*
*Every ten years a great man,*
*Who paid the piper?*
*So many particulars*
*So many questions.*

*by Bertolt Brecht*

## The Distant World

As early as 4000 years ago in the civilization of Indus Valley there existed cities(Harappa, Mohenjodaro, etc) that were prime examples of progressive architecture for their times. Broad streets running north-south crossed others at right angles forming blocks roughly 360 by 185 metres. These blocks were further interspersed with smaller streets.

Each house was a self-contained unit mainly made of wood and fired bricks and was at least two storeys high with an open flat roof. The houses had bathrooms and toilets with proper outflows. Above the houses were citadels, public baths, state granaries, temples and other such buildings.

## Honouring Gods and Men

The people of ancient times built not only remarkable houses to live in but even their public buildings were most magnificent.

Can you think of Athens without its Parthenon or Egypt without the Pyramids or Babylon without its Tower of Babel?

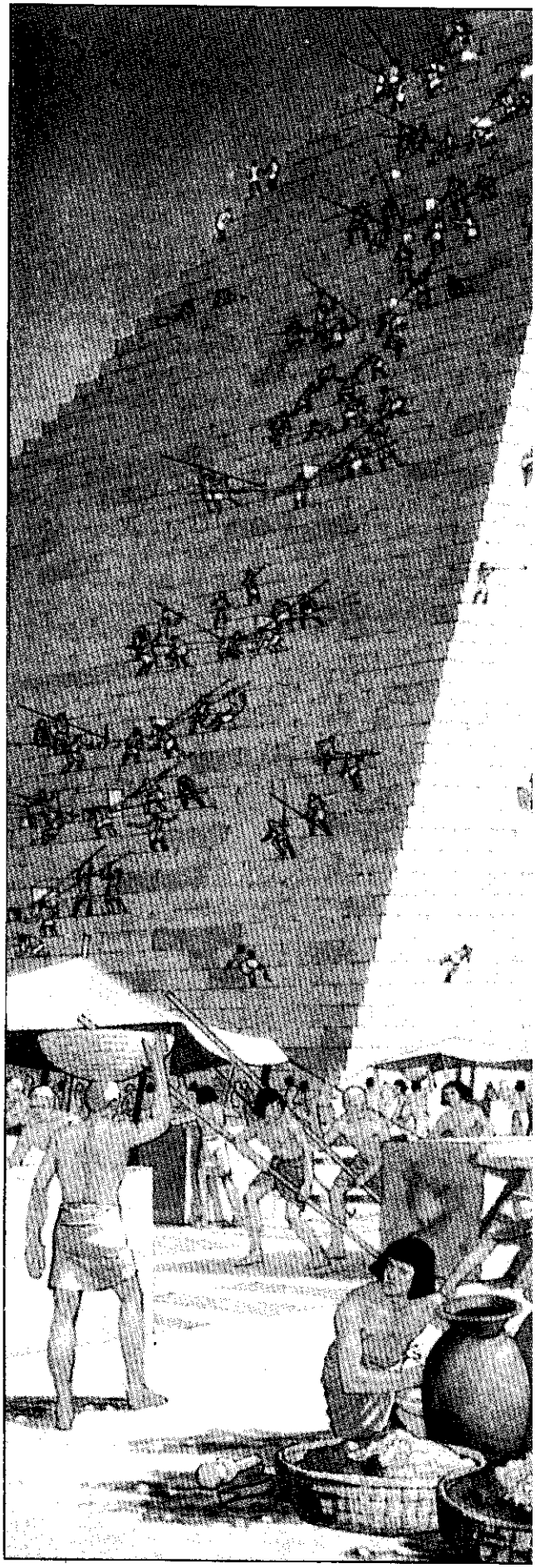
These buildings were tremendous feats of workmanship and have attracted a lot of attention. They are among the seven wonders of the world.

The Pyramids are considered the greatest wonder of all. An ancient Arab proverb says, "Everything is afraid of Time, but Time is afraid of the pyramids."

The pyramids were made with huge blocks of stones. It is an architectural feat how these blocks were moved and assembled in an age before modern machinery came into being.

The most famous of these is the Great Pyramid of Giza(Gizeh), built for King Khufu, about 2600 B.C. The base is 779 feet and it rises to a height of 463 feet at its peak. It contains 23,00,000 two and a half ton blocks of limestone fitted together with great accuracy. Inside the structure, the chambers were lined with granite blocks.

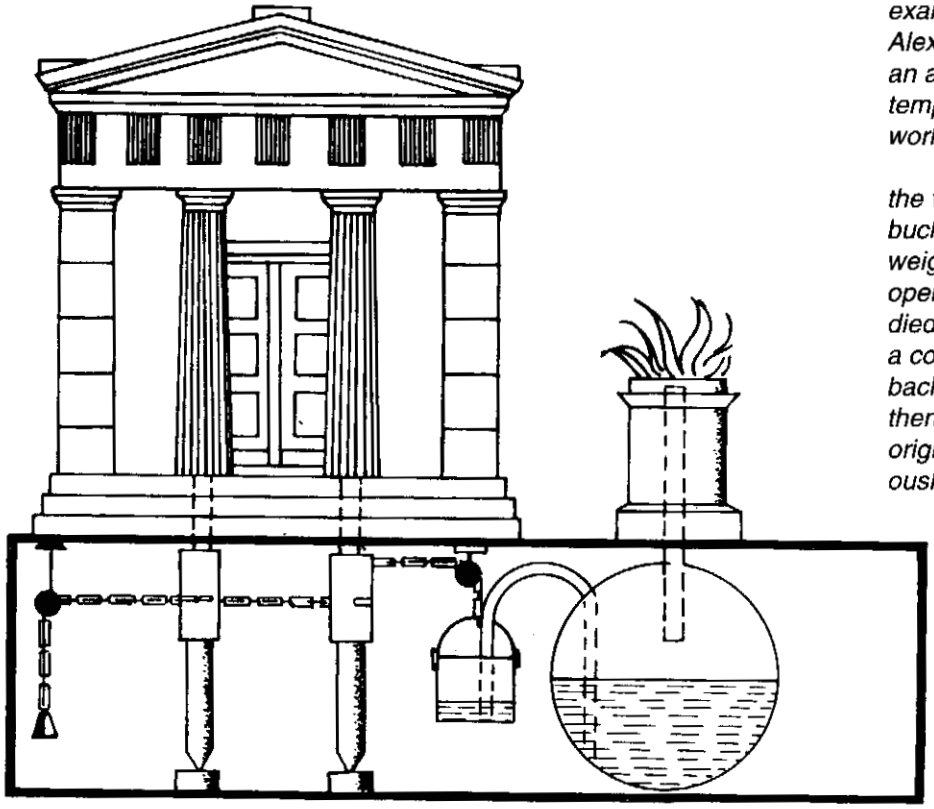
Herodotus, the Greek historian said, "It took ten years oppression of the people to make the causeway....." (to float the stone blocks from the Nile to the site of the pyramid). It took another twenty years to complete the building of the pyramid and about 10,000 men(slaves) were engaged in this task.



## *Ancient Science*

*The people in the ancient era definitely had a scientific bent of mind. They developed some fascinating devices in their temples based on the principle of hydraulics. One example is what Heron of Alexandria used in a temple - an automatic control of the temple door.This is how it worked:*

*Warm air pushed some of the water in the boiler into the bucket, which with its increased weight, caused the door to open. When the sacrificial fire died down the air cooled and as a consequence the water ran back into the boiler. The weight then raised the bucket to its original height and simultaneously closed the door.*



As mentioned before men, women, children and indeed whole families work at sites. Who employs them and who is responsible for them?

To understand this, we must look at the whole system of construction which is intricate and very complex.

In India, the largest chief employers in the area of construction are Central and State governments. The other employers are private firms and individuals constructing hotels, office buildings, clubs etc. The chief employers contract the construction to a contracting agency which includes not only the shell of the building but also the electrical wiring, light fittings, whitewashing, painting, woodwork, bathroom fittings, air conditioning etc.

This contracting agency, then sub-contracts the different work to other agencies or individuals to fulfill specific needs., eg. electrical wiring, plumbing, glasswork, polishing of floors, painting, woodwork etc.

This sub contractor, depending upon the volume of work, may further give the job to a `thekedar'. It is this `thekedar' who employs the labourers, gives them their wages, fixes leave rules, timings, breaks etc. In short, he hires and fires.

The construction worker rarely knows who the chief employer is and therefore no relationship or communication exists between the two. He is entirely at the mercy of the `thekedar' who is only interested in making as much money on the contract, as is possible.

As all the workers are temporary, he does not give them facilities of any kind. Pay is cut if workers are late, if they do not work due to illness. Even pregnant and nursing mothers are not given any kind of concession in work eg. no breaks, no lighter loads to carry etc.

## UNDERSTANDING MIGRANT LABOUR

**Visit a construction site near your home or school. Talk to some of the workers there to try and find out details about them.**

**Remember it may take more than one visit for the workers to share their life story with you. Explain the purpose of the visit and tell them about your project.**

**Use the following as guidelines**

*** Where have they migrated from, and why did they leave their village?**

*** Where do they live? How do they commute?**

*** If they live on site, what happens when the construction is completed?**

*** When construction work is stopped during the monsoon season, do they get paid? If not, what do they do?**

*** What are the facilities they get:Provident Fund, gratuity, leave, medical aid?**

*** Where are the rest of their families? Do they miss village life?**

*** Do their children get education in the cities?**

*** Look around and see what the children do:**

**The babies - who looks after them?**

**Young children - what do they do?**

**Teenagers like you-what do they do during the day?**

**Talk to them and find out their dreams, hopes and aspirations.**

For many of us moving home is a common experience, especially if our parents have transferrable jobs. We may find it fun, moving to a new city, our luggage being moved in trucks, a new house, new friends, a new school.....

But many construction workers who have to move frequently, do not find it very exciting. In the span of one month they could move four or five times to different sites. They build their huts with waste material from the site and place their meagre belongings in them.

Each building is the same. It may be a different size and shape but the dust, dirt, sand, flies and mosquitoes are all the same.

They face similar problems of no running water, toilets or electricity. A few sites have creches for young children but the majority do not. Invariably the children are left to fend for themselves when their mothers are at work. Older siblings, who themselves are only six or seven years old look after infants. If this is not possible, the mothers are forced to take them to the site with them. Teenage children work at the site to earn extra money for the family .

## WORKING HAZARDS

Though some work has been done on the occupational health hazards of construction workers, the information obtained is still insufficient. A lot more research needs to be done, but it is a daunting task, given the nature of the work force.

They are migrant and unorganized. Being totally at the mercy of the 'thekedar', they are under the constant threat of losing their job. As their names are not on a payroll, it is difficult to fight cases on their behalf for injuries and accidents at the work site.

A range of hazards and work risks exist at the construction site and include the following:-

* Injuries and death due to collapse of the scaffolding due to which workers fall from a height. No proper guards or railings are provided to prevent such accidents from taking place.

* Strain on eyes due to work at night when proper lighting is not provided.

* Construction sites are common places where fires occur, very often due to a short circuit in the electrical wiring.

* Electrocution is a grave risk because of unprotected wires or damp floors.

* Many workers suffer from deafness because of the noise levels. Several different noises at one time, all of them above tolerance level also give rise to headache eg. the noise of the cement mixer, electric drill, hammer on iron or metal, polishing machine etc.

* Blasting in a rocky area is a common technique used to clear the area. Workers sometimes suffer injuries when flying rocks hit them.

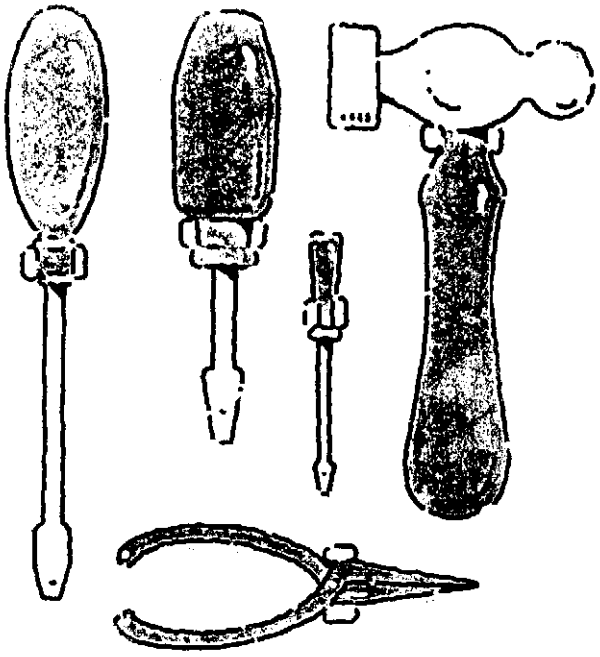
* Very often workers engaged in underground work eg. making tunnels, find the roof collapsing on them. This could lead to severe injuries and death.

## IMAGINE, FEEL, EXPRESS

**Imagine you are a construction worker. You and your family have shifted to a new site. The farmhouse you are to construct belongs to a very rich man. He is designing it as a playhouse for his children who are 7 and 10 years old.**

**It has swings, merry go round, slides, jungle gym, swimming pool for kids, skating rink etc.**

**Write an essay describing your feelings as a construction worker on the completion of this project. Also describe the feelings of your wife and children. How do you think they would react to this place?**

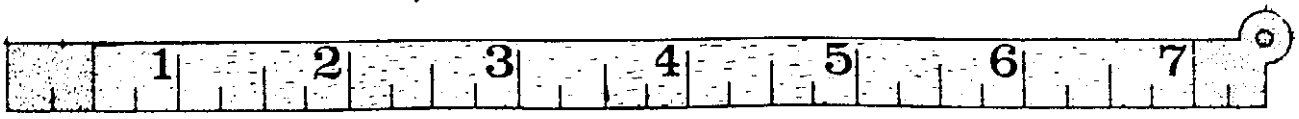


## DRAW A STRAIGHT LINE

**Draw a straight line from one end of a wall to another without the help of a tape measure. Instead, use a thin tube and water to help you draw your straight line accurately.**

**As this is not a technique you are familiar with, it may be difficult for you to do so.**

**You could go to any construction site near your home or school and learn from the labourers who work there. Ask them to teach you this skill and you will see for yourself how adept they are at it.**



Other diseases and hazards are listed below:

| Hazard | Cause |
|---|---|
| Silicosis | Sand |
| Asthma, nasal cancer | Fumes from electric drill, welding machine,etc |
| Cancer of lungs | Plaster |
| Irritation to lungs Cancer and skin diseases | Cement |
| Blood pressure | Working at heights |
| Sun burns, strokes and cramps | Exposure to heat and sun with no facilities for shade or cool drinking water (dehydration) |
| Numbness of hands and fingers | Vibration |
| Sprain, rheumatism, body ache | Heavy loads and repetitive work |
| Malaria, typhoid and jaundice | Presence of mosquitoes and flies on sites. Impure drinking water |
| Bronchitis, pneumonia and other diseases | Exposure to cold and damp working environment |

Several years ago a Government Committee was set up to investigate the situation of construction workers and formulate a policy which would protect their rights and interests. But to date nothing concrete has been done.

## THINK ABOUT IT.....

Rita, a middle-class housewife looked out of her apartment window to the house being built across the road. She held her 6 month old son in her arms and sang softly to him to keep him from crying.

At the construction site across the road she saw a saree tied to a small tree, which evidently served as a portable bed for a baby.

While Rita was still on her balcony the baby in the saree started crying, at first softly and then louder and more desperately.

She waited for the baby's mother to come and comfort and feed the child. No one arrived, though a young woman labourer looked towards the tree many times. Rita presumed she was the mother. Finally, the child cried itself to sleep.

In the course of the day she saw the mother come to feed the baby three times, yet was not willing to spend time with the child, to kiss or cuddle it. "Very strange behaviour," thought Rita to herself. She would never do that to her child. "If people could not look after and spend time with their children ... well they should not have them."

For the next two days the same scene was witnessed by Rita. The third day was unbearable, the little baby was crying incessantly, it seemed to be unwell. "This is it. I am going to tell them off today... they cannot do this to the child... it's unfair."

At 5 p.m. she marched off downstairs, in a very righteous mood.

As she reached the site she saw the mother take the baby out of the "saree bed" and hold the child close to her. She was joined by the father, who took the child and showered it with kisses. Rita stood a little bewildered; this was unexpected, what was going on? The couple looked at her questioningly. They were expecting her to say something. So she asked them why they let the child cry all day, it needed to be looked after, after all it was so young.

The baby's mother looked her straight in the eye. "Do you think we don't love our child and do not want to spend time with her? I see you carrying your child and feel envious. I would like to be able to do the same thing. But it is not possible. We need to work to be able to survive....."

And then the young woman came out with the whole story... the thekedar, them losing their jobs, not being able to take a few days off, the fact that she came back to work two weeks after she had the child.

Rita listened,ashamed of herself. She walked back home in silence.

## *THE WOMAN CONSTRUCTION WORKER*

*The woman worker in the construction industry carries a three fold burden in harsh and subhuman conditions.*

*A ceaseless load-carrier, she is given only hard physical labour through out the day with no shelter or room for respite. All doors to learning and skilled jobs are closed.*

*A harrassed mother, she gets no maternity relief, no leave, no place to keep her children except on the dangerous worksite. There is no way to educate her older children.*

*A struggling home-maker, she has a hovel for a home, no drinking water for her family, no latrines or drainage where she lives, no ration facilities or health services nearby.*

*No respite from morning to night.*

*Mobile Creches is a response to some of these needs of the `invisible child` of the `invisible parents`. They are called Mobile Creche because the centre closes once the construction of the particular building is over. The workers go their separate ways and it is impossible to follow them.*

*Mobile Creche is more than a day - care centre. They run an integrated child care programme which includes supplementary nutrition, a continuous process of developing awareness about hygiene, the children are exposed to creative activities, songs, drama and helped in entering formal schooling system.*

*There are many `children` who have come back to Mobile Creche to work with them or have gone to the Merchant Navy or are doing law degrees.*

## NO ENTRY

**2000 labourers working night and day built a prestigious five star hotel in Delhi. Three months after it opened two of the labourers, dressed in their usual clothes, wanted to go and see the hotel that they had helped build. At the entrance, the doorman refused to let them in.**

* **Why do you think this happened?**
* **How would you have reacted if you were the doorman?**
* **What would you have felt if you were the labourer?**
* **How would you have responded if you were the manager of the hotel to whom this problem was presented?**
* **Will these labourers never be allowed to go into the hotel they have helped build?**
* **Would the situation be any different anywhere in the world today? Why?**

## RAJINDER`S STORY

I am sixteen today, and have seen drastic diversities in my life.

I come from a poor and large family of nine members. Ever since I can remember, my parents have been working hard to earn bread for us, as labourers on construction sites or daily wage earners in the corn fields.

We are from the state of Maharashtra, where we never lived at a permanent place, but kept shifting in search of work. When I was about six, we left Maharashtra and came to Delhi.

When we came to the capital, I never imagined going to school. Coming from Maharashtra, my own language was Marathi. I didn`t know how to speak Hindi, and that was a problem. And my father could not even afford to feed the family-sometimes we had to ask where the next meal was coming from. So the question of going to school was put aside for a time.

This depressed my father, who had wanted to get us educated since he was illiterate.

But after two years I had learned Hindi, and got admission to a government school. The school was very serious, and most people came from comparatively poor families like mine.

Then I was taken into Springdales, a public school under their gifted children scheme, because I had caught up and was doing well at the government school.

It was the beginning of a new life. I felt inferior at first, because the people at Springdales were of higher status, and I often felt they belong to a much higher level of society, of which I could never be a part.

But slowly I managed to get over these ideas. Today I have many good friends, in Springdales and outsides. I don`t consider myself inferior to anybody now.

All teaching at Springdales is in English. When I went there I didn`t even know the letters of the English alphabets. I worked sincerely for two years, and can now communicate well.

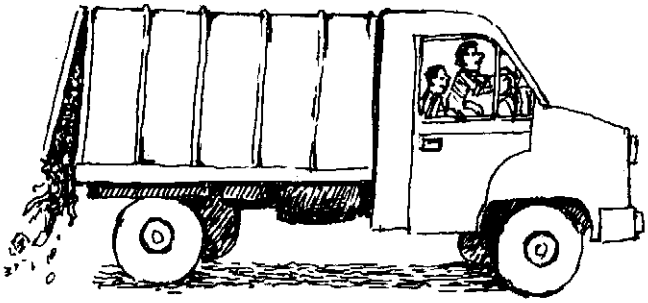
I am still at Springdales and happy there. My family is still moving about in search of work, but is now much happier. We can afford our three meals a day at the moment.

After school I go home, to a small single-roomed hut, near the construction site where my parents work. I share this one room with the other eight members of my family

I have never had an electric bulb glowing in my house. I have got used to study under the street lights, or with a kerosene lamp.

I face a different life at school from my life at home. In school I am with people who are totally different from my family-in culture, language and social position. But I never find difficulty in coping with these two worlds. In fact, I enjoy playing the two roles, like in a play.

# Municipal Workers



By now you would have a good idea of what kinds of diseases, hazards different people are exposed to in their different jobs.

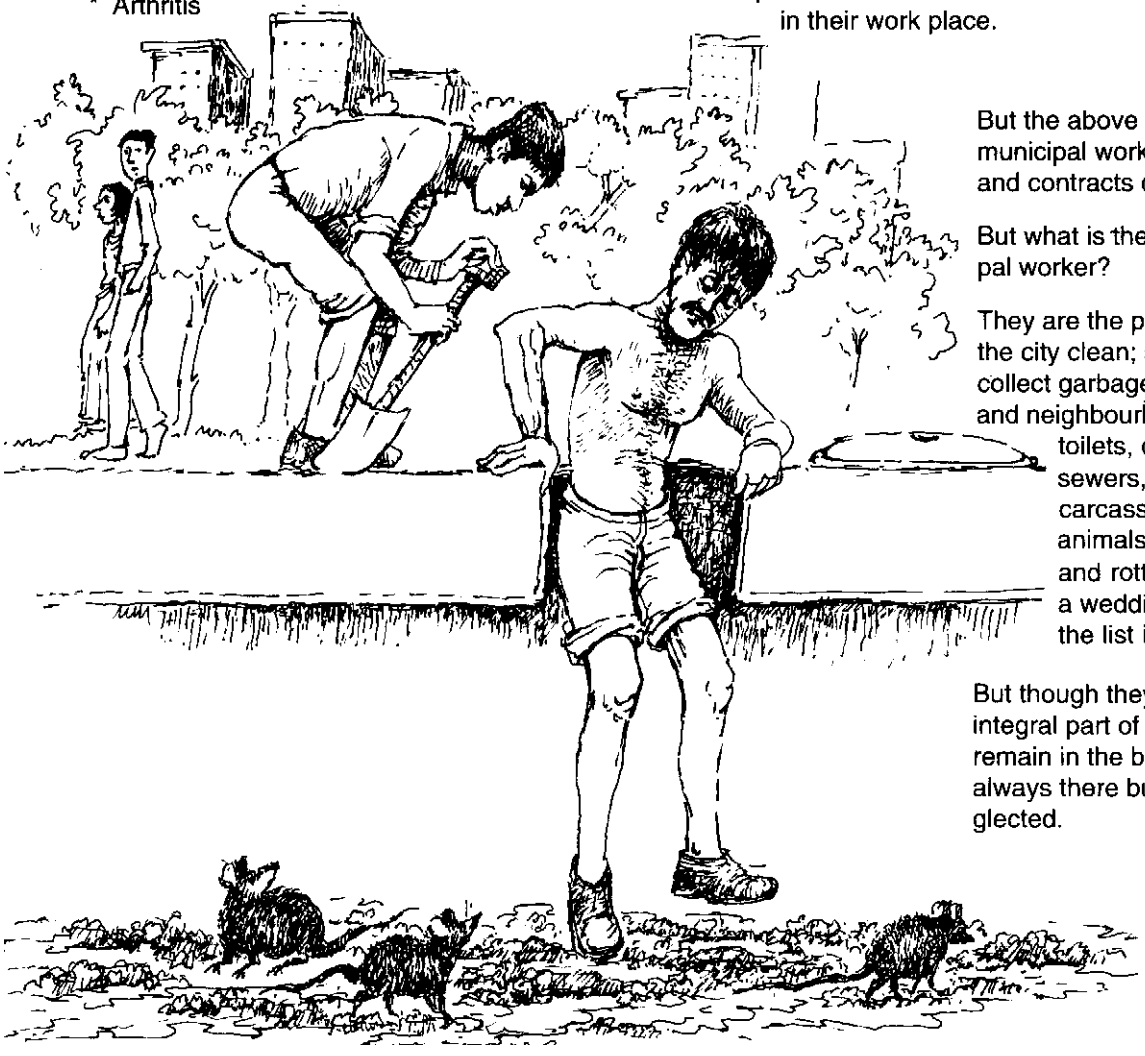
From the list given below try to guess in which work places people would be exposed to these diseases:

* Headaches
* Conjunctivitis
* Breathing problems
* Lung diseases caused by fumes and other irritant gases
* T.B.
* Scabies, and dermatitis(a skin disease)
* Cuts, burns, scratches
* Arthritis
* Loss of appetite and other digestive disturbances
* High blood pressure
* Bites from insects and rodents
* Muscular aches and pains
* Broken limbs

You have probably thought of:

* Executives
* Miners
* Textile workers
* Chemical workers
* Construction workers

and several others. You are right, they are exposed to one or two of these diseases and hazards in their work place.



But the above list is what every municipal worker is exposed to and contracts during his career.

But what is the job of a municipal worker?

They are the people who keep the city clean; sweep roads, collect garbage from our homes and neighbourhood, clean our toilets, drains, gutters, sewers, take away carcasses of dead animals, clean up filth and rotten food after a wedding feast.... the list is endless.

But though they are such an integral part of our life they still remain in the background - always there but ever neglected.

## WHO CLEANS YOUR NEIGHBOURHOOD?

**Do you know the name of the person who cleans the roads, collects garbage etc in your neighbourhood?**

**Each of you should find out how much you know about the sweeper who works in your home.**

* **Where does he/she live?**
* **What is their level of education?**
* **How many children do they have?**
* **Do they go to school?**
* **How long they have been working for your family?**
* **Does any member of the family hold another kind of job?**

**Don't be too surprised if you find you know nothing about these people. It is customary in our society to have as little as possible to do with them.**

What are the terms by which municipal workers are called by your family and in your neighbourhood?

Add to the list given below:

1. Safai Karamchari
2. Sweeper
3.
4.

Some of these words are very derogatory and are also used by many people as a form of abuse..... for eg. to call someone a `bhangi' is abusing them in the vilest possible way.

No so called 'decent' person even today would like to be associated with a Scheduled Caste leave alone marrying one, having a meal with them or making friends with them.

Who are these people we treat as outcasts, even though they play an important role in our society?

To understand the origins of these people we should go back in history - to the time when the caste system originated in our country.

The four traditional `Varnas' or social groupings in olden days were:

| | | |
|---|---|---|
| Brahmins | - | priests |
| Kshatriyas | - | warriors |
| Vaishyas | - | traders |
| Sudra | - | artisan or cultivator |

Outside of these castes were the untouchables, the lowest in the social order.

These social divisions were based on occupations and originated to enable a smoother functioning of society. But over the years they got so deeply entrenched in the caste system and so rigidly defined that it was not possible to move out of them.

Amongst the untouchables there are sub-castes eg. Dhobi, Barber, etc but the sweeper was considered the lowest of the low.

It was his job to keep the village clean. This included the carrying of `night soil' on his head. It was this job that was considered to be polluting and for which there existed no cleaning or purifying ritual. As a result the person who keeps the place clean is the one who is given the lowest status. He is considered to be polluted. And those who do not clean their own houses and toilet are considered to have a "high status".

Over the years the rigid barriers of the caste system have broken down. People now take up occupations they are interested in rather than those they have inherited from their families.There are more and more examples of inter caste marriages, which make the caste divide even less visible than before.

Yet, for the untouchable, these changes in society have had very little impact on his life. Living below the poverty line and shunned by others, the lot of the Harijan is a miserable one.

The term `Harijan' refers not to `a child of God`as intended by Gandhiji but to a `social outcast.`

For many Harijans even today entering a temple, drinking water from the village well, living in the main area of the village is strictly prohibited.

Children still follow the family occupation as very often they are deprived of education and have no other option.

In today's age what is the work that the bhangi', `achhoot', now termed Harijan, safai karamchari or municipal worker do, and what are its hazards?

## GARBAGE,GARBAGE,ALL AROUND.....

**Let us think on our own of the work done by a municipal worker. To help you do this, imagine the following situation:**

**It is the monsoon season. The rain has come down in torrents for the past week and as usual the city's sewerage system has collapsed. There are floods in several parts of the city , drains are blocked and parks are pools of slush and muddy water. The garbage lying in municipal bins is already rotting and the stench is overpowering.**

**But, the worst is yet to come. The municipal workers and sweepers of the city have declared a month long strike beginning today.**

**What would be the consequence of such a strike on our daily lives: in our homes, offices, schools, street, neighbourhood etc.**

**Describe the situation and the chaos that follows in the form of a series of sketches, poetry, prose or even a song.**

*Delhi has a population of ten lakh people. If we estimate an average of one kilogram garbage per person per day (this includes garbage on streets, drains, kitchens, construction sites, etc) this would add up to the staggering figure of 10 lakh kilos or ten thousand quintals of garbage.*

*How many rooms full of garbage would that be ????*

*What happens to all this garbage, where does it come from and where does it go?*

*What do the municipal workers feel about collecting the garbage?*

The Municipal Corporation of Bombay has introduced compactors. These are machines which lift containers of garbage, compress the garbage, carry it to dumping sites and unload it.

This machine has three benefits:

Firstly, one compactor can hold the garbage of two ordinary trucks.

Secondly, this reduces the number of workers, as not only is one truck used but it is also mechanized.

Thirdly, it leads to fuel efficiency, as the fuel of one truck is saved.

All of this sounds great, modern, westernized, hygienic. Yet it is not such a happy ending or beginning.There are problems of the compactor getting unhooked in mid- air, resulting in accidents.

In a demonstration run of a compactor at Bombay, the garbage container got unhooked in mid - air. Such accidents may lead to injuries.

The Encyclopedia of OHH by ILO says that "The modern, rear loading, enclosed compactor is one of the most hazardous. The rate of accidents in municipal work where it is used is very high."

These containers do not get fully emptied on their own, so workers have to manually push out the remaining garbage. As the machine compresses the garbage, liquid from the trash oozes out. This drips out of the compactor all along the route.

WE ARE GIVEN SHOVELS TO PICK UP THE FILTH AND SLIME. VERY OFTEN GARBAGE IS COLLECTED ONLY AFTER 7-10 DAYS, AND THE STENCH IS UNBEARABLE. OUR HANDS AND FEET ARE ALWAYS BARE, LEADING TO CUTS AND BRUISES. OFTEN WE ARE BITTEN BY MOSQUITOES AND OTHER INSECTS LIVING IN THE GARBAGE. ONCE I GOT A CUT FROM BROKEN GLASS, WHICH LATER DEVELOPED PUS, AND STARTED OOZING. I HAD TO GO ON LEAVE FOR A MONTH AND A HALF, WITHOUT PAY.

## MAKE YOUR OWN COMPOST HEAP

**Much of the rubbish that goes into your dust bin is bio-degradable. This means that it decomposes. For eg. vegetable peels, fruit and all food stuff. It includes paper, bits of cloth, match sticks, grass, leaves, dead flowers etc.**

**All this can be used to make excellent fertilizer for plants. You can prepare your own compost heap in school. And in a few months, the gardener will not have to buy fertilizer for the plants.**

**All left over food from tiffin boxes, the canteen, paper, pencil shavings, leaves, grass, flowers should be used for the compost heap.**

**Remember to remove items such as glass, empty chip-packets, fruit juice tetrapacks and plastic bags, as these are not bio-degradable, i.e. they cannot be "broken down" by nature.**

**You may need a teacher to help you start this activity.**

**1. Make two "boxes" about 2 feet x 2 feet square, and 4 feet high - by driving four corner posts into the ground, and wiring on light sticks for the sides, (or use chicken wire for the sides). Put small stones and twigs on the ground in the box for ventilation.**

**2. Put in a 9 inch (23 cm) layer of vegetable waste.... cut-grass, leaves, weeds, kitchen-waste vegetable-peel, eggs-shells, etc. and wet this well.**

**3. Sprinkle well with lime (choona) or wood ash.**

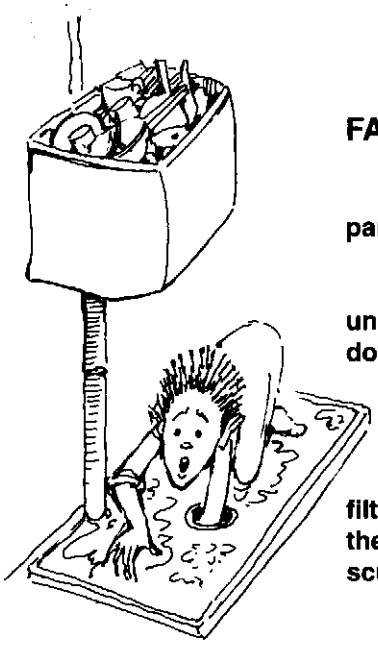
**4. Add a 2 inch (5 cm) layer of soil.**

**5. Repeat these layers till the box is full.**

**6. Wet the heap regularly, except in rainy weather.**

**7. After the heap has stood for about six months, remove it from the box. Mix it well and put it in box 2. Keep wetting it from time to time. Leave it to rot further for about three months or so. It should then be ready to use.**

**8. As soon as you have transferred the rotting compost to box 2, start a new heap in box 1.**



## FACE THE STRAIN, HAND IN DRAIN

**Very often our kitchen drain gets clogged because of all the food particles that are pushed down the drain.**

**Our drains are smaller versions of the large sewers that run underground in all our cities. Our municipal workers clean these, why don't we try cleaning our own drains?**

**NOTE - PLEASE USE BARE HANDS ONLY**

**Take the loose metal cover off the kitchen drain. First clean all the filth and food particles that have collected over it. Turn it over, and then using a scrubber and cleaning powder, scrub it, clean off all the scum accumulated on the other side.**

**Use the same scrubber to clean the sides of drain of the slime and filth and take out any accumulated rubbish. Pour clean water down the drain till the black looking water disappears and you can see it replaced by clear water.**

**Discuss with others:**

a) **How many of you were able to complete all the stages outlined above?**
b) **Why did people give up in between?**
c) **What were your reactions to the job, physically and mentally?**
d) **What did you do after completing the job?**

## *A Child Inside The Gutter Is Like A Rat*

*My name is Pandu Rao Bhanji Kamble. I am 14 years old and work in the Municipal Corporation. Young boys like me are used to clean small sized sewers as the entry point is too small for a grown up man to enter. These sewers carry a mixture of urine, filth, effluent water, acid and oil from mills and other places.*

*The scavenging has to be done at a bent posture and we work neck deep in the gutter. We have to clean 10-12 gutters each day. We get afflicted with diseases like eczema and scabies. T.B. is also very common. When our bodies get rubbed on the gutter wall it causes scabies all over, sometimes it causes fungus infection as well.*

*When we come out, our bodies are covered with filth, but there is no provision to wash it off. One day we struck on the idea of sitting in the sun to dry the filth. After this we rubbed dry mud all over our bodies and in this way got clean.*

*Whether it is hot, cold or monsoon weather we have to clean the gutters everyday. We are small in size and age yet we have to lift heavy loads of filth from inside the gutter. All I can say is that once inside, the child looks like a rat in the gutter and in my experience feels like one.*

*"Why can't you bathe at work before coming home."*

## DIVERS IN THE MUNICIPALITY

What job would divers have in the municipality? You have just one guess? They dive!

Yes, they do deep diving in the sewers and gutters of Bombay to a depth of 80-100 feet.

If the sewers get choked and the water level rises, the workers dive in, submerging themselves completely inside the sewage to clean the choke. They are not provided with any protective equipment or any tools to clean the blockage. Very often the blockage is caused by the carcass of a dead animal stuck in the drain which has to be pulled up by the diver.

## MYTHS

Over the centuries our attitudes to people who do our cleaning have been turned into myths, which we are ready to believe. Given below are a few such myths. Along with them are some reactions of municipal workers which help dispel any doubts that these are true.

I. These people are used to doing such work, it does not affect them, they do not mind.

* "I am a healthy man but whenever I enter a gutter, I feel my throat choking, I cannot eat my food later. Think of those who are not as healthy and strong as me."

II.They always smell because they don't bathe.

* "We do not have any facilities to wash ourselves. No water, let alone good soap or disinfectant."

* "The only time that we do not smell is when we have not entered the gutter for a month."

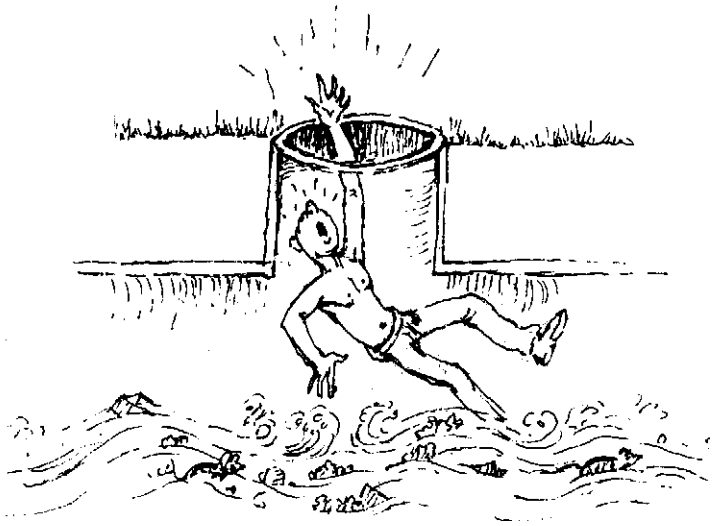
Due to the working conditions many main sewer workers suffer from T.B, asthma and skin diseases. They also complain of insomnia and anorexia (lack of appetite), headaches, nausea, dizziness, diarrhoea, other infections of the digestive tract. These create problems in their private and social lives. Others suffer from physical, psychological and pathological conditions due to continuous night work.

*Sewerage workers face serious accident risks such as:*

*1.Gassing - Deaths in sewers have occurred from poisoning by carbon monoxide, benzene, hydrogen sulphide, carbon dioxide and methane concentration - lack of oxygen is another factor leading to death. In 1986 two workers became unconscious and died in the sludge as they could not be pulled out of the sewer in time.*

*2. Injuries - Head injuries are caused by objects falling down the manhole. Toes are often crushed by heavy manhole covers. Cuts, wounds, scratches, grazes, bruises are part and parcel of a day's work, though when they get septic and infected then lead to other complications.*

*3. Immersion - Although the rate of drowning is not high, sewer men have been washed away due to the fast flow of sewage water.*



III. They are not interested in educating their children, so they have to follow the same profession.

* "Very often we do not have money to educate our children. If one of them does manage to get a good education it is difficult to find a good job."

* "People want to know your background, and who will give preference to a scheduled caste? Though there are reservation for scheduled castes, we have to pay bribes to get those reserved jobs. Again not having money leads us right back to square one."

IV. They have no concern for their health and even eat stale food given by people.

* "Many times we are given stale or rotten food, that we do not want. Yet if we refuse the person might get offended. So we accept it, but then throw it away....."

## DESIGN A POSTER

**Design a poster for your neighbourhood encouraging people to throw away their garbage in plastic bags and to put old tins, broken glass bits etc in separate bags. What will the caption say?**

**Think of possible locations in your neighbourhood where the poster can be put up.**

## TEN FEET IN THE AIR WITH A MANHOLE LID

A rickshawpuller sleeping near one of the Connought Place drain-blasts site last night was sent 10 feet high into the air by the impact of the explosion. Moments later the adjoining manhole`s lid went flying.

"I saw him go up in air," said Mr. Ganesh Shetty, a garbage collector, who was sitting close to the adjoining manhole but escaped injury "by the grace of God." First he saw smoke, then flames, which "went really high."

His friends, namesake Ganesh and Vijay - both rikshawpullers were injured. The cause of the blasts will be probed by a committee appointed by the Chief Minister. It is to give an interim report in 48 hours.

The members inspected the sites today and collected samples of the liquid-waste from the affected drain-sewers.

"Efforts are on to ascertain if anything inflammable got into the drains," said officials. The Chief Minister told the assembly that one of the reasons could be petrol that found its way into the system from a nearby filling station. Or it could be a spark igniting methane that emanated from stagnant fermenting sewage in the drain.

Stagnant sewer waste, which is organic, ferments in anerobic conditions (due to lack of air) letting off gas which is a mixture of 70% methane, 20% carbon dioxide and 10% carbon monoxide.

"Both methane and carbon monoxide are, together and otherwise, highly inflammable," said a Delhi University chemistry professor. The content of carbon dioxde is not considered enough to stop the fire from breaking or putting it out.

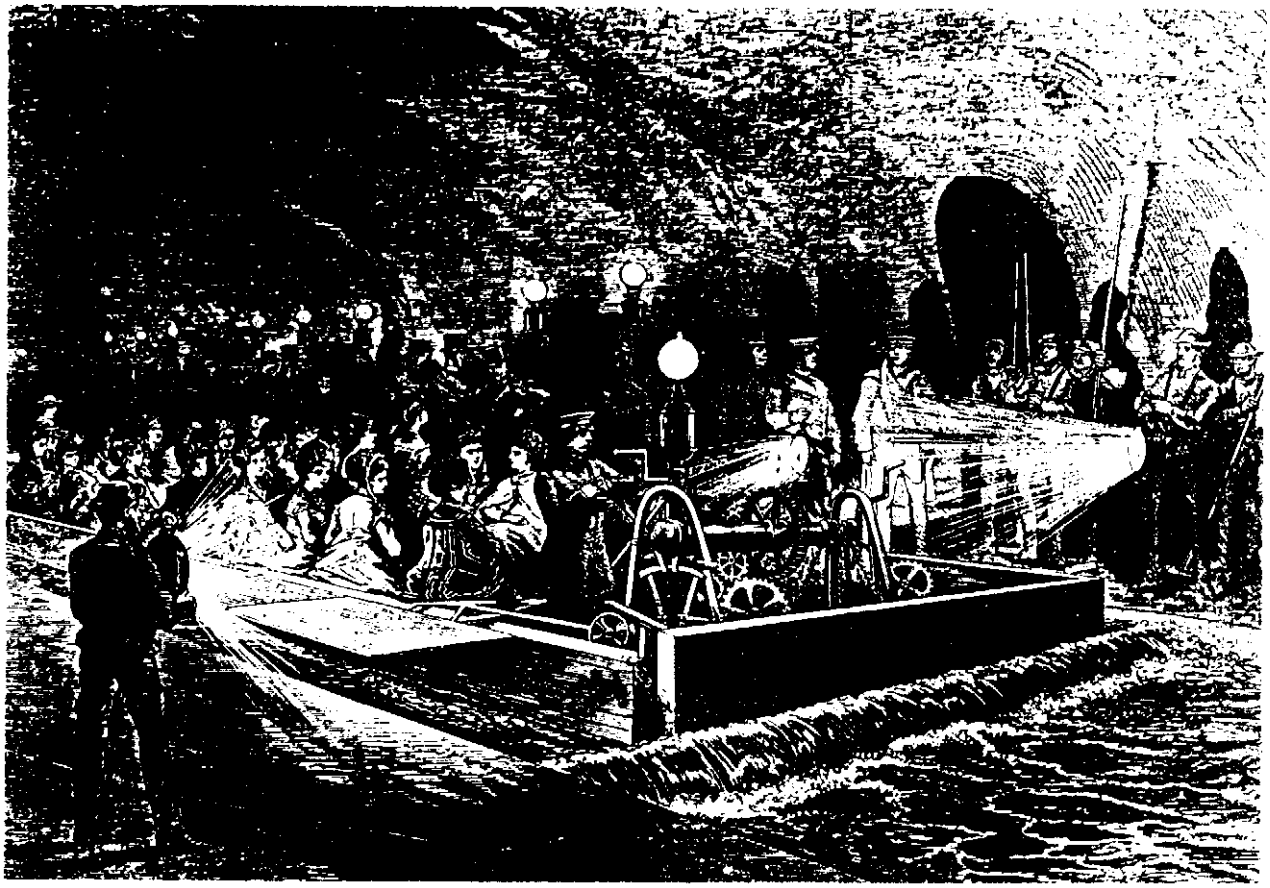
There have been such instances earlier. An MCD official got burnt while inspecting a manhole in Patparganj four years ago. He was peeping into the manhole, when a scooterist flicked a lit match into it, igniting the gas lying heavy, deep down.

Drainage system official said "it is possible somebody threw a lit matchstick into the affected network, setting off the blasts, or, sparks from a motorvehicle may have ignited methane gas trapped inside."

Organic waste has also been found emanating methane in open areas such as the sanitary landfill sites used for dumping garbage. A mix of methane and merchapten emanating from the Hastsal landfill is being used as cooking gas.

The municipal corporation admits to that. And has issued warning notices to the residents using this inflammable mixture. Some incidents of fire have also been reported in this connection - as the supply is not easy to stop.

- The Times of India



## IN THE SEWERS

Let's take a tour in a sewer....

No, it`s not a silly rhyme or a joke. It is the truth. There were public tours of the main sewers of Paris, in 1870. This is because the Paris sewers contained only surface water. Sewage was still removed in carts as it had been done in the preceding centuries.

In Victorian London, Irish women were denied work except as casual labour, cleaning the filth from the polluted, streets, docks and canal sides. Advertisements for better jobs often carried the condition "No Irish need apply." Although the discrimination is rarely so blatant today, a large proportion of London's 1,25,000 low paid, part-time cleaners are Asian, Hispanic and Afro-Caribbean women, denied employment and trade union rights.

London still has a large percentage of sweepers and cleaners who are Indian. These people clean the filth and garbage of this city yet, in their own country they would refuse to do such work as it is considered to be the work of lower castes.

This chapter must have left you feeling sick and wondering what role you can play in improving the condition of these people. We agree their job is what it is, but all of us in our own way can make their lives easier and their jobs more tolerable to themselves. We know where garbage should be thrown and how it should be thrown. So let us decide from today we will not throw litter around.

# WORD JUMBLE

| A | O | P | C | Y | A | N | I | D | E | Q | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | R | P | F | M | O | R | S | A | V | I | E |
| E | E | S | I | I | E | F | X | G | C | R | T |
| T | L | O | E | M | E | R | Y | R | H | S | H |
| O | S | O | O | N | T | D | L | M | L | G | A |
| N | E | F | T | I | I | S | E | A | O | L | N |
| E | S | H | V | O | E | C | N | T | R | A | O |
| M | A | R | X | T | H | E | A | W | I | A | L |
| A | L | I | T | E | R | I | J | O | N | E | L |
| C | N | A | D | P | S | U | C | H | E | I | L |
| T | A | D | R | I | Q | A | P | R | I | T | I |
| M | E | T | H | A | N | O | L | U | S | I | E |

Find the 10 different chemicals hidden in the jumble of words on the left.

**The following words are signs of OHH. Can you guess what they are from the mix up of each word.**

ESUANA _____

SNESZIZID _____

EHCADAEH _____

AMEDEO _____

SESFNAED _____

TIGAFUE _____

SPARMC _____

ICNGOGUH _____

**ANSWERS**

**CHEMICALS**
Acetone, Xylene, Chlorine, Methanol, Cyanide, Ethanol, Arsenic, Dioxin, MIC.

**OHH**
Nausea, Dizziness, Headache, Oedema, Deafness, Fatigue, Cramps, Coughing.

# IN OFFICE

We have covered a wide range of occupations and the various ways in which they harm the workers. This is true not only in factories and mills but is true in any working place.

Have a general discussion in your class room as to where parents of each student work and as what. Eg - supervisor working in a factory.

Perhaps many of them have desk jobs and work in offices as stenographers, telephone operators, accountants, computer experts, managers and executives. Many parents would also be bureaucrats in Government offices.

Make a list of the different professions and work places of all parents.

Discuss: When parents return home do they ever complain of

| | |
|---|---|
| Headaches | Throat ache |
| Eye strain | Eye pain |
| Backaches | Numbness |

Do they have chronic colds and runny noses, stiff knees and joints?

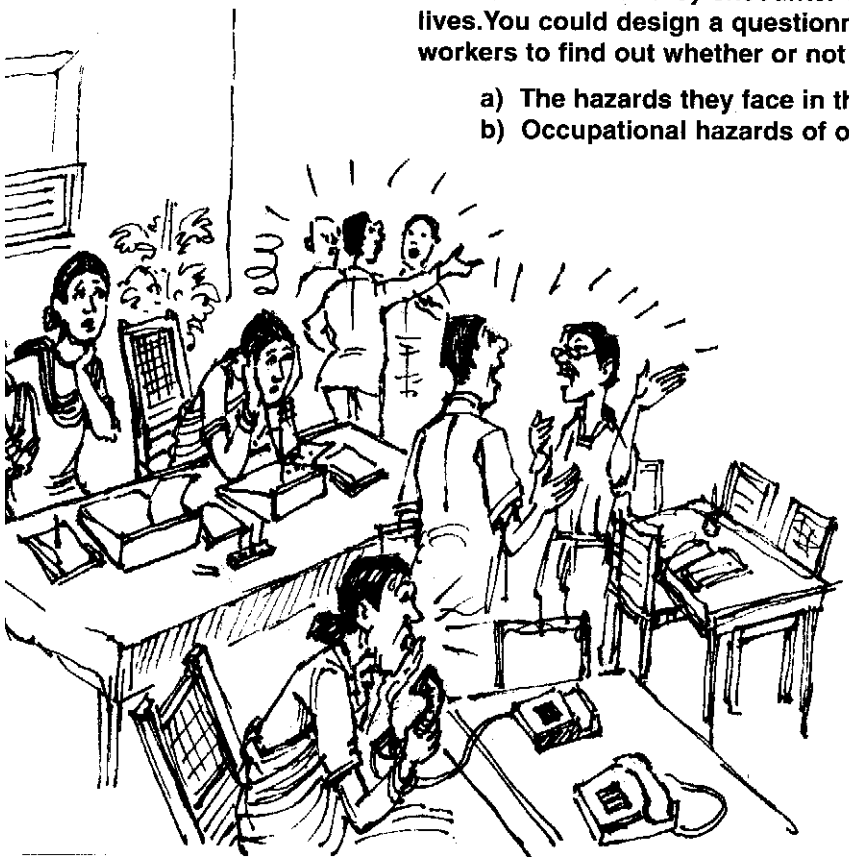
Probably they would and many of them would just dismiss these as part of a day's work. Others would be more specific in realizing where the root of the problem lies.

We tend to believe that hazards and accidents take place only in factories. But office work too is full of hazards which are not as obvious as burns due to acid, but which exist nonetheless. Eg. strain on eyes due to working on the computer for too long, or a chronic cold resulting from entering an air conditioned office and then going into the hot or cold weather.

## OHH-HOW MUCH THEY KNOW

**There are many people who are not aware of the occupational or work hazards that they encounter or are exposed to in their daily lives. You could design a questionnaire for office goers i.e. desk workers to find out whether or not people are aware of:**

**a) The hazards they face in their own work**
**b) Occupational hazards of other jobs**



**You could test the questionnaire with:**
**a) Your own parents**
**b) Your neighbours**
**c) Some of the teachers in your school.**

**Analyse the information from the questionnaire.**

**1. Are people aware of hazards in their work if so, what are they?**
**2. What are the symptoms people suffer from in the work situation?**
**3. How long has it been since these symptoms developed?**

**You will be surprised at some of the things you learn and also amazed at the fact that people are ignorant of the dangers they are exposed to at work.**

Let us look into any office on a working day.

* Mrs. A sits at her desk to operate the telephone PBX. After a whole day's work she is exhausted, complains of headache and throat pain. The cause -talking on the telephone the whole day and the constant ringing of the telephone.

* In a room 10 X 12 feet four typists start work on their machines. At 5 p.m. they go home with aching arms and back and a headache.

* In the documentation department the photocopier is uncovered and the operator starts making copies of various documents. At 5 p.m. the person complains of nausea.

Stress at work can be attributed to many factors such as noise, poor lighting and ventilation, work load pressure and over crowding. Sometimes the sheer repetitiveness of a task can increase stress eg. filing, filling in forms and ledgers, putting back books in a library.

If a work environment is not pleasant then the worker will face problems. Let us examine some of these factors.

VENTILATION - Air conditioned offices are now becoming increasingly popular due to the use of computers and other new technology. Air conditioning is linked to a uniform constant light. This makes it boring and monotonous.

Lack of fresh air causes suffocation and frustration. It is important for health to have a constant supply of fresh air at the right temperature. Stale air circulated in the office can cause nausea, irritability, tiredness and loss of concentration.

In summer the air conditioners are set too high, forcing people to wear long sleeved clothes or even a light shawl. In winter the heat is so much that people wear no woolens in the office. The problem arises when people have to go out into the natural weather. The contrasts in temperature give rise to problems of a chronic cold and frequent headaches.

Adequate ventilation is needed in rooms where duplicating machines are used, especially those which use ammonia or methanol.

Constant exposure to methanol can lead to eye irritation, headaches, giddiness, insomnia and disturbance in vision. Many photocopying machines produce ozone when in use, which can cause irritation to eyes as well as tissues lining the throat, air passage and lungs. Headache, cough, pain in chest and breathing problems are other associated symptoms.

## USE OF CHEMICALS IN OFFICE

Though it is not obvious, office workers are exposed to chemicals in the form of stencil fluid, copy machine toner, ink correction fluid, carbon paper, duplicatcr and cleaning fluid, ink remover, typewriter ribbons etc.

Many of these contain solvents but as they are unlabelled, people do not realise their hazards. Many of these substances can cause dermatitis and other skin related problems.

## THE WORK STATION

"Executives get the best chairs and secretaries get the worst, which is too bad because secretaries spend more time in them," said a professor who designed a chair for office workers.

By sitting all day in the same position workers have a tendency to develop varicose veins. This is accompanied by a feeling of heaviness or tension, cramps during the night and itching especially in hot weather.

There is now a trend to design chairs keeping in mind complaints of back and neck pain.

## LIGHTING

When planning an office very often little or no thought is given to the installation of lights. Natural light is the best for eyes. Yet this is sacrificed by the desire to make the office look sophisticated.

An attempt should be always made to light desks and tables from the side rather than directly in front. This directs unwanted reflections away from the eyes, rather than into them.

Poor lighting gives rise to glare, causing stress, tension, headaches and eye strain .

*Though human beings have an extraordinary ability to adapt to their environment, their well being, morale and moods are affected by light and colour.*

## *ALL WORK AND NO BREAKS MAKES THE OFFICE A DREARY PLACE*

What are some of the essential factors to keep in mind so the workers in an office are relaxed and perform to their maximum,thereby producing better results?

**Tea-breaks** - Taking a tea break is important for a number of reasons.The tea is stimulating. The breaks provide opportunities to talk to friends, fix small details of union business, get a break from noisy machines or to just get away from your regular work place. These all help to recharge your mind and body.

It has been shown for example that the highest accident rate amongst train drivers is two hours after breakfast. The cause - low blood sugar.

Unfortunately tea breaks are one of the first things that the management tries to remove.

**Recreation room facilities** - A table tennis table, badminton rackets, a football are some of the simple equipment needed to relax a worker and give him some exercise in lunch break or even after office hours.

Working long hours gives people very little time to exercise or to join a gym/health club. Facilities in the office where workers spend most of the day is an opportunity that will be well used.

**Lunch room**- A separate room or area for having lunch, which is well lit and ventilated is essential.

If hot fresh meals can be provided by the employer it would be ideal. It saves the workers the time and bother of preparing lunch, carrying it and eating it out of a tiffin box.

If this is not possible an alternative could be to provide an arrangement to heat lunch (a hot case) and plates to eat from.Provision for clean drinking water should also be made.

An annual get together, sharing opportunities, building up of inter personal experiences are all essential factors that keep workers happy, relaxed, make for optimum work efficiency and an overall better functioning of the organization.

## MONITORING OF WORKERS

Can you imagine a situation where a computer is monitoring every minute of the day you spend in school?

How long it takes for you to complete your maths ! Did you spend eight minutes in the bathroom instead of three? The note you slipped your friend during the boring history class.....

Terrible ! Yet it is true of many work places.

In a typical set up people are monitored through several types of computerized methods.

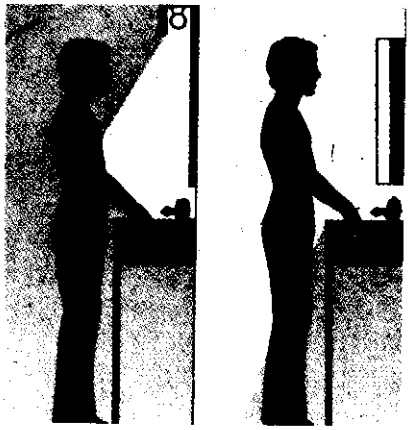
Their pace of work, number of mistakes, amount of rest time is electronically checked. Workers can lose their jobs, if they do not perform quickly or accurately. When the pace of work is too much the worker struggles to complete his work faster and this leads to stress.

In India too this system is being introduced in offices which use high technology.

But unions in Western countries are fighting this unhealthy and unfair system. They even refuse bonus and incentives based on work speed or work quota.

## REDESIGN YOUR PARENTS` OFFICE

**How are offices designed? Visit a few - your father`s and mother`s office, and see how effectively they deal with the issues raised in this chapter i.e. lighting, ergonomics, ventilation etc. Are the desks placed in a way that allows for both privacy and interaction, are the various things used daily on each desk within easy reach eg. the telephone, the computer keyboard, the switchboard, filing cabinets etc.? Several offices today are encouraging bringing greenery indoors, which could be either real or synthetic plants. Why is this being done? Other offices are organised in a casual fashion - armchairs instead of deskchairs, garden benches for meeting instead of a conference table. Why? Try your hand at redesigning the office you have seen so that it is more user-friendly, pleasant and has less ohh.**



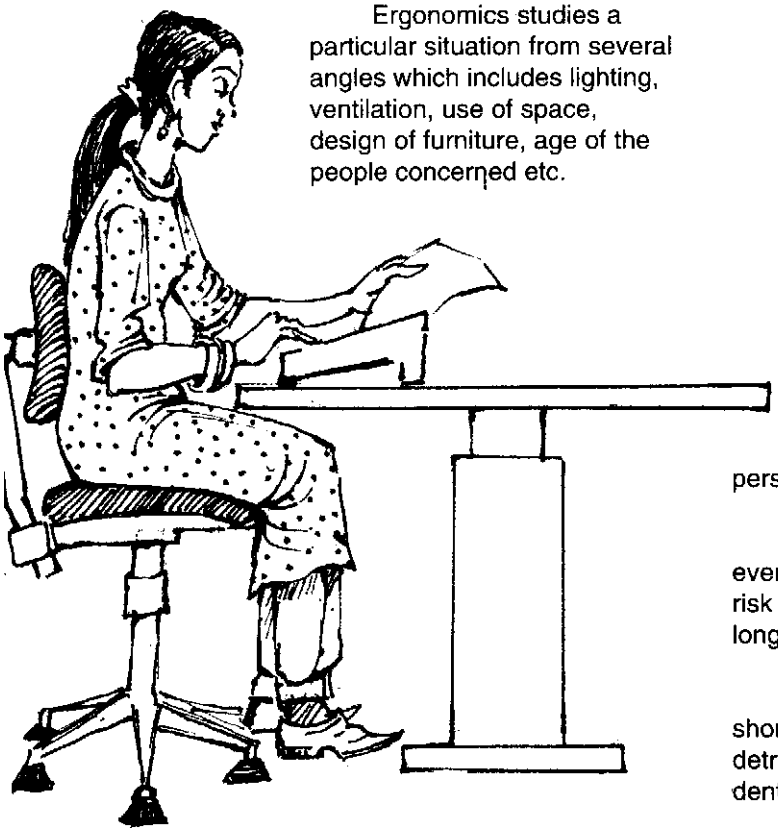
*Light mirror from side, not above*

*Reading lamp positioned behind*

*Concealed lamp gives better light*

### Ergonomics

Ergonomics studies a particular situation from several angles which includes lighting, ventilation, use of space, design of furniture, age of the people concerned etc.



Ergonomics is concerned with helping a person to do his/her task and to do it efficiently.

According to the ILO encyclopaedia - whenever one plans on minimizing or removing a certain risk or hazard, they must consider the short and long term benefits.

Not only should the benefits be positive in the short run but in the long run there should be no detrimental effects on health. The risks of accidents should also be minimal.

## HAZARDS IN SCHOOL

Write a report on your school's environment keeping in mind the following points. Discuss the findings with your teacher, give positive suggestions and submit the final report to your Principal.

1. Are the classrooms well ventilated and well lit?

2. Are the classrooms clean?

3. Are the classrooms comfortable in summer as well as in winter?

4. Are the toilets well lit, ventilated and clean?

5. Are there any areas that are accident prone? For eg. low parapet, blind corners, improperly stored equipment.

6. Are there any slippery places? For eg. water cooler area.

7. Are the water coolers safe from the possibility of electrocution?

8. Is the drinking water from the cooler free from impurities?

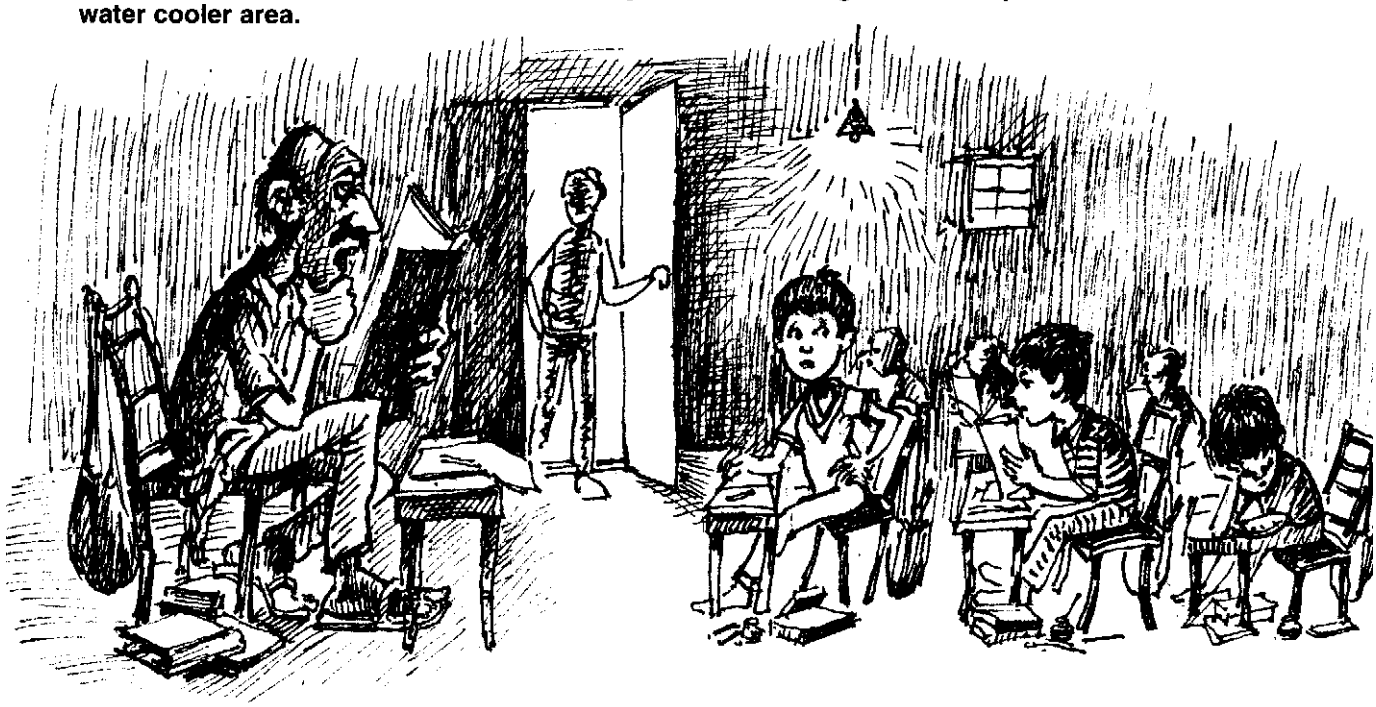
9. How often is the cooler cleaned?

10. Is the canteen clean and the food prepared and stored hygienically?

11. Is the place where the school buses come safe/cordoned off to prevent accidents?

12. What safety measures are taken to prevent outsiders entering the school?

Make sure your report also mentions the positive aspects of the school's environment. If your report only reflects the negative aspect it is likely to anger people, besides which it will not give the true picture.



## RE-DESIGN YOUR CLASSROOM

Why don't you try your hand at being an ergonomist for your own classroom?

Study all aspects of your classroom carefully including

Ventilation
Lighting
Use of space
Design of desks and chair
Location of classroom - is it near a noisy area eg. main road or playing field
Position of blackboard and teacher's desk
Use of wall space
Colours used in the room (walls, display boards etc)

Now keeping all these factors in mind, redesign your classroom, so that every student is able to achieve his/her optimum efficiency in this new environment.

## *COMPENSATED FOR A WHISPER*

*LIVERPOOL: A British school teacher who lost her voice shouting at her pupils won the right to industrial compensation on Thursday.*

*Frances Oldfield, 55, was forced to retire early in January when her voice was reduced to a whisper. Social services officials agreed her voice loss was an industrial injury and promised to pay damages, to be determined later.*

*Oldfield, who taught primary school students for 17 years in Huyton, north west England, claimed that the modern "open plan" layout of the school forced her to constantly raise her voice to be heard.*

*The Professional Teachers Association said her case could open the gates for claims by hundreds of other teachers.*

## ISOMETRICS

**One group can prepare an illustrative chart depicting 6-10 simple exercises for teachers to do in the staff room, to relax stiff muscles and ease body tension.**

**Here are some ideas:**

**When standing, for example during a telephone call, raise yourself up and down on your feet. This strengthens and improves circulation in the calves and feet.**

**Put hands on shoulders and move your elbows up and around making circles.**

**Hold out your arms to shoulder height and move them backwards in small circles, with elbows held straight.**

**With feet apart and bottom tucked in, stretch upwards as far as you can, breathing in deeply, and keeping your head up. Try this in a doorway, so that you stretch upwards towards the frame.**

## BETWEEN THE TEACHER AND THE CHALK

**We have spoken of work hazards in many different types of jobs. What we are fast realizing is that**

**'WHEREVER THERE IS WORK THERE WILL ALWAYS BE A WORK HAZARD'**

**This implies that our own teachers too face work hazards. What about work hazards of our school sweeper, the typist, the receptionist cum telephone operator?**

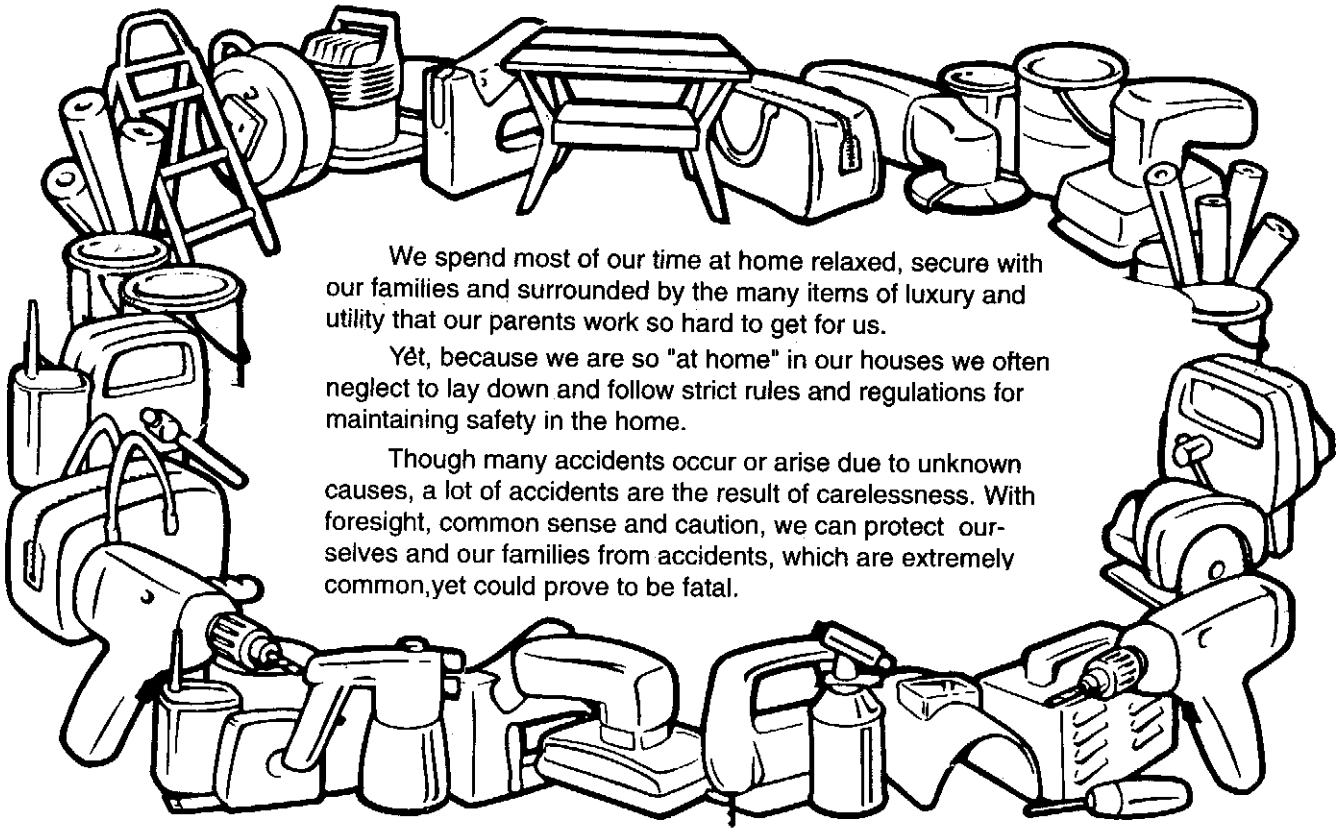
**Divide the class into 4 or 5 different groups to study the work hazards of these people who work in your school.**

**The study should include what the work hazards are. It should also make concrete suggestions on how these can be minimized. This could mean suggestions for better designed tables for the typist, minimizing use of chalk which can affect the throat etc.**

**Some guidelines to keep in mind:**

**Repetitive work - corrections**
**Varicose veins**
**Arm and wrist strain.**
**Proper lighting and ventilation**
**Affects of chalk dust**
**Staff room furniture, tea break and recess, recreational activities etc**

# AT HOME



We spend most of our time at home relaxed, secure with our families and surrounded by the many items of luxury and utility that our parents work so hard to get for us.

Yet, because we are so "at home" in our houses we often neglect to lay down and follow strict rules and regulations for maintaining safety in the home.

Though many accidents occur or arise due to unknown causes, a lot of accidents are the result of carelessness. With foresight, common sense and caution, we can protect ourselves and our families from accidents, which are extremely common,yet could prove to be fatal.

## RANDOM YET RISKY

Keep all plastic bags away from babies and young children. While playing they may put the bag over their heads and run the risk of suffocating to death.

* Never switch on an electric appliance while carrying a child. In case you get an electric shock, the child will be affected too.

* Drowning takes only a few seconds, even in shallow water.

If you store water buckets in the bathroom, lock the bathroom door. Even a child as old as two years can get in, fall headfirst into the water and drown. It has happened in many households.

* Be watchful of young children. Install inexpensive gates across doorways, and never leave an infant alone on an elevated surface, (like a table) for even an instant.

* Don't leave young children unsupervised for any length of time, particularly in the more "poisonous" rooms of the house, the kitchen and bath. Do not under-estimate their ability to get into child proof containers and out-of-reach cabinets.

* Do not over-estimate their ability to determine what is food and what is not. Don't store those everyday potential poisons (acids,phenyl etc.) in ground level places, eg. under the sink. And, never store poisonous materials in food containers and jars or glass bottles. Make periodic poison checks throughout your home to make certain everything is properly labelled and stored.

* All homes are filled with a tantalizing array of bric-a-brac - buttons, beads, coins, screws, nails, playthings and more - that are quite tempting to a baby in the "hand to mouth stage". Small objects such as these lodge easily in the throat and nose of young children. Even foods a child may not know how to eat properly, such as popcorn, nuts and hard toffees, should not be given in case they be inhaled rather than swallowed.

* A cot or playpen can be a potential source of danger for infants. Infant furniture should have slats spaced no more than 2 1/2 inches apart to keep baby's head from getting caught.Mattresses should not be covered with thin plastic coverings. An infant is defenseless to the suction created after inhaling thin, filmy materials. In short, children under the age of four are the most likely to fall victim to suffocation, strangulation or choking. Watch them carefully.

* Do not give children knives, screwdrivers, nails, hammer and other such items to play with (no matter how blunt they are). Keep them in locked drawers or tight containers.

* Keep all tools in good condition and select the proper tool for each job. A misused screwdriver can cause a painful hand puncture.

## FALLS AND FIRES

Even the most nimble-footed can easily become prey to an accidental fall. Falls from ladders, stairs, roofs-even ground level falls- claim more lives than any other type of home accident. Learning to recognize the hazards around the home that may send you sprawling, can save you from a broken back, fractured skull, internal and other injuries, or a less serious case of loss of dignity.

Those most likely to suffer from the consequence of a fall are older persons aged 75 and above. Decreased mobility, failing eyesight and hearing problems combine to hamper their awareness of potential hazards. Ailments such as arthritis can cause unsteadiness, and medications can lead to drowsiness and other side effects which increase the risk of taking a tumble, for both young and old alike.

Be sure all staircases have secure handrails. Don't use stairways for storage, and be sure they are well-lit.

Make use of bedside lamps and night lights in darkened hallways and bathrooms.

Floor plants and lamps make lovely decorations, but keep them in their proper place.

Don't overload yourself and obstruct your vision when travelling up and down stairs, make two trips - even if you are sure just how many stairs there are.

Never use anything in place of a ladder. Don't climb up on that collapsible folding chair to reach the cabinet over the refrigerator. Don't use the cushioned footstool to change the kitchen light bulb. Such pieces of furniture were not made for the uneven distribution of weight that can occur when you are standing on a chair. One wrong move can upset the center of gravity and you will go toppling over. Do make sure that your ladder is in good working order, with clean, level and sturdy rungs.

Make sure all rugs and carpets stay firmly on the ground. If they slide around on a polished floor, they can seriously injure old people and young children when they step on it.

A fire strikes quickly and indiscriminately. Saving your family from the ravages of a fire depends upon prevention, planning and practice.

Preventing a fire from occurring in your home requires effort, but is a manageable task. Store all combustibles and flammable substances including

kerosene. petrol, thinner or leftover fireworks properly.

If there is any question about the safety of your wiring system, call in an expert to be sure your home is electrically sound.

Are your room heaters and blowers operating properly? More fires take place in the cold weather, than at any other time of the year.

Practice safe cooking habits. Never leave hot oil unattended. Keep pot handles turned away from the gas front and avoid wearing billowy articles of clothing while cooking. Do not wear synthetic clothes while working in the kitchen.

Keep a small, all-purpose fire extinguisher handy in the kitchen and be certain each family member knows how to use it. Most of us don't realize how quickly a fire can spread. Knowing when to call the fire department can mean the difference between life and death. Don't hesitate to call for help for what may seem to be only a minor mishap. Children and elderly people remain the most frequent victims. Only your commitment to fire safety and prevention can save you and your family from the most agonizing of home accidents.

## First Aid For Burn Victims

To remove the clothing from an injured body, cut off the clothes rather than pulling them away. Let the blisters remain as they are, and do not use any techniques to break them. Cover the wound with a clean cloth.

A recent trend in first aid of superficial burns is to immerse the burn in tap water for 10-15 minutes, or till the burning ceases as soon as possible after the accident. This will immediately cool the wound and limit ensuing oedema. Water also removes acids and bases.

If the burn is above 5 percent, immediate hospitalization is necessary. Take care that victims are not given any liquids to drink except in the case of electrical burns.

## BATHROOMS

One of the most potentially dangerous rooms in your home is the bathroom. Apart from the possibility of falls and poisoning occurring here, bathrooms are notorious for cuts, burns, electrocution and drowning. Hair dryers and electric razors can give you the shock of your life, if placed where they can fall into the wash basin, toilet or on to the wet floor.

Keep glass bottles out of the shower or bath, and if you prefer a shower door to a curtain, be sure it is made of safety glass or heavy duty plastic.

## POISONING

Keep in mind that drugs can be harmful as well as healing. Even aspirin can cause serious problems when taken improperly. Exercise caution when using over the counter, non-prescription drugs. Read the label carefully, once, twice, even three times. Never take prescription drugs that have not been prescribed especially for you by a physician.

When medications are no longer needed, dispose of them by flushing them down the toilet. Keep medicines in a less accessible area, or under lock and key.

Many poisons are easily recognizable as such. There are, however, thousands of everyday household items that can kill or cause debilitating illness when taken internally or used improperly. Among these are the following:

| | |
|---|---|
| detergents | cosmetics |
| furniture polish | lighter fluid |
| disinfectants | deodorants |

vitamins and even some common household plants.

*AN OUNCE OF PREVENTION AFTER ALL, IS WORTH A POUND OF CURE.*

## HOMELY HAZARDS

Have any of you realized that being a full time housewife and mother is a job with tremendous occupational hazards.

Being a working mother has a double exposure to hazards.

Study groups of mothers in batches of ten - office and non-office going. Do a detailed study of each mother's day. When she gets up, the breaks and rests, the number of chores she has to do - from packing tiffins to fixing a fuse, changing a bulb, doing homework.

Remember all of them work equally hard!

Remember the tea breaks in offices, protective equipment when using harsh detergents, acids and cleaners that factory workers use; does each mother get these facilities?

Suggest means and alternative ways of making her work environment pleasant, tension free and with minimal hazards.

Distribution of work amongst other family members could be a good way of dealing with overload. Remember the better a mother functions, the better it is for the family.

Not only will you realise and appreciate all that your mother does, you will also come up with ideas to help.

You will be surprised at the results of your project.

We would also like to thank the following students for reviewing the manual and giving their suggestions:

**1. ANANDALAYA SCHOOL, Anand.**

Class-IX

1. Alok Tongaonkar
2. Anjana Iyer
3. Arpit Patel
4. Avishek Singh
5. Gunjan Pandey
6. Joseph Abraham
7. Kaushal Vyas
8. Keyur Patel
9. Nidhi Sharma
10. Payal Trivedi
11. Rajeev C.R.
12. Rashmikant Patel
13. Ravi Patel
14. Rohan Patel
15. Sanaj K.N.
16. Sheetal Ganju
17. Shrikant J.
18. Stuti Purohit
19. Varun Mathur
20. Vaibhav Shah
21. Nikesh Majithia
23. Amita S.Patel
24. Amuda Arul

Class-XI B

25. K.Praveen Kumar Reddy
26. Hetul Patel
27. Namita Sinha
28. Sujana Patel
29. Sonali Singh
30. M.Venkat Rao
31. Deval Patel
32. Shreya Chakravarty
33. Ruchika Rai
34. Gautam Patnayak
35. Vihar Subnis

**2.BHARATIYA VIDYA BHAVAN**

| | | | |
|---|---|---|---|
| 36. Yeshasvini R. | IX-D | 37. Leela K. Tiku | XI-B |
| 38. Rosy Joshi | IX-A | 39. Anshu Gupta | |
| 40. Pradyuman Kapoor | XI-D | 41. Divya Negi | IX-A |
| 42. Abha Sandill | XI-B | 43. Anudeep Sapaliga | IX-A |
| 44. Shubhangini Singh | XI-C | | |

**3.BLUEBELLS SCHOOL**

| | | | |
|---|---|---|---|
| 45. Aarti Kumari | IX-C | 46. Sumita Bajaj | IX-C |
| 47. Shailender Singh | IX-D | 48. Kapil Anand | IX-C |
| 49. Priya | IX-C | 50. Geetika Saint | IX-B |

**4.MOTHER'S INTERNATIONAL SCHOOL**

| | | | |
|---|---|---|---|
| 51. R.Srikant | IX-C | 52. Nitin Kumar | IX-B |
| 53. Nidhi | IX-D | 54. Aditi | IX-E |
| 55. Arunabh | IX-A | 56. Megha | IX-A |
| 57. Akshay Pujari | IX-D | 58. Nidhi Sugandhi | IX-D |
| 59. Rashie Ratan | IX-E | | |

**5.SARDAR PATEL VIDYALAYA**

| | | | |
|---|---|---|---|
| 60. Durba Chattaraj | IX-A | 61. Ashish Bhatia | XI-B |
| 62. Kartikeya | XI-A | 63. Molshree A. Sharma | XI-A |
| 64. Janaki Srinivasan | XI-B | 65. Abhijit Menon | IX-B |
| 66. Ramona Jind | XI-A | 67. Deepa Dharmadhikari | IX-B |
| 68. Madhavi Chand | IX-A | | |

**6.SPRINGDALES SCHOOL**

| | | | |
|---|---|---|---|
| 69. Anika Gupta | IX-C | 70. Abhijit Mahindroo | IX-A |
| 71. Anurag Goel | IX-D | 72. Kush Ahuja | XI-A |
| 73. Ashna Verma | XI-A | | |

## LIST OF ACTIVITIES

1. Black-out
2. Trapped Underground
3. Write an evocative report
4. Design your own comic strip
5. Where do I come from
6. Ethnic fashion designer
7. Sound-power
8. Quiet sounds
9. Drive yourself deaf
10. Your family and shift-work
11. Design a book Jacket
12. Organic pesticides
13. Child Labour - A Portrait in drama
14. Be an Ergonomist
15. Child Labour Survey
16. Role-play
17. OHH at home
18. Burnt Art
19. Bar Charts
20. Reaching out
21. Crossword Puzzle
22. Life without glass
23. Make your own kaleidoscope
24. Reuse broken glass
25. Who else have `hot' jobs
26. Beat the heat
27. Using Cinema
28. Give the cook some relief
29. Glass collage
30. Analysing a photograph
31. Word Jumble
32. What chemical is in your `mithai'?
33. Acid on petals
34. Making a model lung
35. Suffocation
36. Make your own liquid soap
37. Potter around
38. Accident/OHH?
39. Caveman architect
40. Cost of construction
41. Wah Taj!
42. Understanding migrant labour
43. Imagine, feel, express
44. Draw a straight line
45. No Entry
46. Who cleans your neighbourhood?
47. Garbage, Garbage all around....
48. Make your own compost heap
49. Face the strain, hand in drain
50. Design your own poster
51. OHH : How Much They Know
52. Redesign your parents office
53. Redesign your classroom
54. Isometrics

**CREATIVE LEARNING FOR CHANGE**
S-286, Greater Kailash II, New Delhi - 110 048.
Phone : 6419862

The varied issues that confront us as a developing society, present challenging possibilites for the creation of innovative educational materials.

Creative Learning for Change creatively translates field based data and real life expriences into publications and documentation, workshops and training programmes, audio visual and other educational materials.

Creative Learning for Change carries out research projects and designs educational strategies that critically reflect the surrounding reality.

Its trustees are well-known in the NGO and development sector and its working group is a team of experienced development educationists.

**Environment Education :**

To address the paucity of material in this area and to motivate young people to become active agents of change, CLC adopts a muilt-pronged strategy.

From writing fictional stories base on actual case studies to conducting workshops for teachers and students on ecological issues to devising stimulating project based activity books, CLC constructively addresses the key concerns of today and tomorrow.

**Non-Formal Education :**

Creating reading materials relevant to the neo-literate and providing training inputs that include teaching methodologies and curriculum design for NFE workers are some of the ways in which CLC actively explores new and innovative ways of tackling the problems of illiteracy.

**Formal School Programme:**

After a detailed study of alternative school systems across India, CLC is helping various NGO's establish formal schools in their areas. The aim is to create a pedagogy that will foster a creative and holistic learning process that will sensitize the child to rather than alienate her, from her own culture and environment.

**Women's Issues and Gender Sensitivity:**

Challenging the existing stereotypes and questioning traditional role models of men and women is the major thrust of our work in this area. This includes empowering women through the sensitive protrayal of the lives of pavement dwellers, deserted women and women leaders through scripts and stories. Further, designing gender sensitive educational capsules that can be used in challenging programmes in schools and other institutions.

Society for
Participatory Research in Asia
42, Tughlakabad Institutional Area
New Delhi - 110062

This book makes you look twice at the jobs people do. The shirt you wear, the glass you drink your coke in, the electricity you use - who makes these and in what conditions? An exciting text, cartoon illustrations and about sixty activities lead you into the world of the dangers within.

Specially designed for use by schools and individuals "The Dangers Within" is an activity book on Occupational Health Hazards. The areas include coal mining, textile, pesticides, child labour, chemicals, glass, construction workers, muncipal workers, occupational health hazards in office and at home.